NATURAL RESOURCE STUDIES

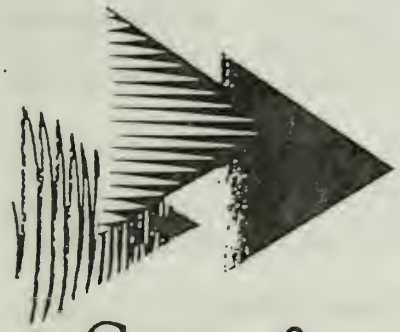
- Agriculture
- Energy and Mines
- Forestry
- Wildlife

Course of Studies

DRAFT

1993–94 Field Review

- Introductory Level
- Intermediate Level
- Advanced Level



Career & Technology STUDIES

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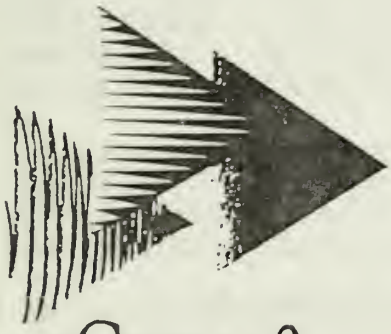

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NATURAL RESOURCE STUDIES

A. PROGRAM RATIONALE AND PHILOSOPHY

Natural Resource Studies focuses attention on the collective physical and biological features of the environment. These features are influenced by the actions of human kind, and have significant impact on the survival and well-being of present and future generations. The Natural Resource Studies curriculum strives to enable students to understand their interdependence with the environment, develop interest in related issues, and make informed choices that maintain and improve the quality of life they experience within the environment. Fundamental to the program is the sharing of practical information and fostering of attitudes that embrace a conservation ethic – a belief that people can and should take responsibility for the well-being of the planet.

The program is intended to develop knowledge, skills and attitudes that will assist students to work individually and collectively toward the conservation and responsible use of water, land, air, forests and wildlife. Responsible management of these resources will enable society to provide for the needs of present generations, without compromising the ability of future generations to meet their needs. Citizens of Alberta, Canada and the world have a responsibility to fulfill economic, cultural and aesthetic goals through resource development, while embracing a conservation ethic so as to maintain essential ecological processes, genetic diversity and an adequate resource base for future generations. The Natural Resource Studies curriculum endeavours to integrate principles of development and conservation, and encourages students to consider practical and common sense ways of managing their use of resources for the benefit of all. Students will examine scientific, ethical, political, environmental and economic issues that impact decisions that are made about producing, processing and marketing natural resources.

Although students are at various stages of cognitive development, many will continue to use concrete operational thinking. Each course in Natural Resource Studies provides opportunities for students to link concrete and psychomotor learning experiences to more abstract thought processes and levels of thinking. Students will be encouraged to transfer the competencies they have developed in other core and complementary school courses as well as through hobbies, interests and past experiences. As students learn to relate theory and practice in participatory situations, confidence will further their ability to meet the challenges of personal life, work life and further education.

Students are in the process of exploring career options as they move through adolescence toward independence and adult responsibilities. In view of the frequent career changes that students can expect to experience, students need to possess the skills and flexibility to adapt quickly to new situations. Future jobs will require that students are lifelong learners, and able to access information and technology as an

aid to solving problems and making decisions. Within these contexts, the Natural Resource Studies curriculum focuses attention on basic, transferable and career-specific knowledge, skills and attitudes that will assist students to:

- become responsible citizens and develop further understanding of the world in which they live
- appreciate career opportunities in the development and conservation of natural resources, and the preparation needed to enter and progress in related fields
- develop confidence and flexibility as they assume adult roles and move into the workplace and further education programs.

B. PROGRAM ORGANIZATION

CURRICULUM STRUCTURE

Natural Resource Studies, like other Career and Technology Studies curricula, has been developed using a modular design. A module is a unit of curriculum that should be achieved by the majority of students in approximately 25 hours of learning.

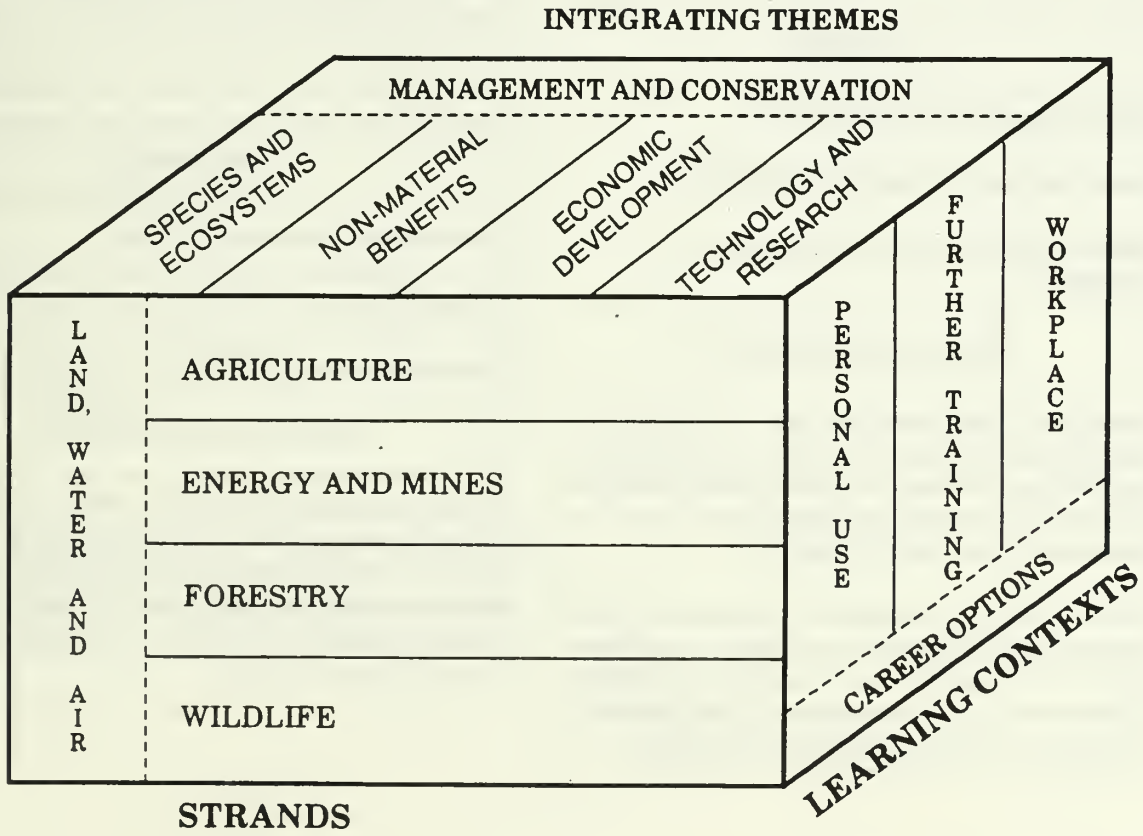
The Natural Resource Studies curriculum is organized into three levels of learning: introductory, intermediate and advanced.

Introductory level courses within Natural Resource Studies develop awareness and establish a foundation of environmental knowledge, skills and attitudes. Learning activities begin at a concrete level, and enable students to understand the environment in a personal way. Intermediate and advanced level courses foster exploration, specialization, preparation and empowerment, and provide opportunities for students to develop more specialized knowledge, skills and behaviours relevant to careers in natural resources or further education and training.

DEVELOPMENT MODEL

The model depicts major emphases within the Natural Resource Studies program. Three dimensions that provide a basis for selecting and organizing content are represented in the model.

- The INTEGRATING THEMES, represented on the upper face of the model, provide structure for the program and focus attention on learning goals common to each strand.
- The LEARNING CONTEXTS, represented on the right face of the model, foster the development of knowledge and behaviours that will enable students to meet the demands of daily living, further training and the workplace.
- The STRANDS provide situational and concrete learning experiences that support the development of knowledge, skills and attitudes relevant to the integrating themes and learning contexts. Each strand focuses on an area of land and resource use.



PROGRAM PLANNING

The Natural Resource Studies curriculum framework ensures that students do not repeat content. Schools and teachers have increased flexibility to design programs based on the needs and interests of their students and circumstances in the school and community. The levels framework will challenge students to keep learning and will provide new and exciting opportunities at each level.

Teachers will select three or more modules to design a course. Criteria that should be considered in designing course sequences are:

- student interests, abilities and career aspirations
- expertise and interests of the teacher
- potential linkages with other school programs.

Samples

Examples of 3-credit courses for each strand in Natural Resource Studies are shown on the following charts.

Agriculture

MODULES
What is Agriculture? (AGR101) From Producer to Consumer (AGR102) Introduction to Agriculture Production (AGR103)
RATONAL/LEARNINGS
Students characterize an agriculture/ horticulture industry through to production, explain how consumer choices affect activities within the industry, and justify the need for sustainable production systems. This course complements the junior high science and social studies programs. It also has links with other CTS strands, including Enterprise and Innovation, Food Studies, Management and Marketing, and Wildlife.

Energy and Mines

MODULES
Taking Inventory (ENM101) Applications of Energy and Minerals (ENM102) The Conservation Challenge (ENM104)
RATONAL/LEARNINGS
Students cite applications of energy and minerals in different sectors of society, formulate development and conservation goals that are related to energy and mineral use, and suggest actions that foster the sustainable management of these resources. This course complements the science and social studies programs. (For example, the Grade 8 science units on Energy and Machines, The Earth's Crust, and Interactions and Environments, and the Grade 9 science unit on Environmental Quality all have applications within these modules.) The course also has links with other CTS strands, including Construction Technology, Design Studies, Fabrication Studies and Mechanics.

Forestry

MODULES
Basic Forest Ecology (FOR106) Forest Forever I (FOR107) Forests Forever II (FOR108)
RATONAL/LEARNINGS
Students suggest possible reasons for the distribution of trees in natural regions of Canada, give evidence of their own impact on the forest and its many resources, and identify actions that will foster the sustainable management of forests.

Forestry (continued)

RATONAL/LEARNINGS (continued)
This course complements the science and social studies programs. (For example, the Grade 7 science unit on Evidence of Erosion, the Grade 8 science unit on Interactions and Environments, and the Grade 9 science units on Diversity of Living Things and Environmental Quality all have applications within these modules.) The course also has links with other CTS strands, including Agriculture, Tourism Studies and Wildlife.

Wildlife

MODULES
What is Wildlife? (WLD101) Natural History of Alberta Wildlife (WLD103) Our Wildlife—Our Responsibility (WLD104)
RATONAL/LEARNINGS
Students suggest possible reasons for the distribution of wildlife in Alberta, give evidence of their own impact on wildlife and its habitat, and justify the need for actions that will foster the sustainable management of species and ecosystems. This course complements the junior high science and social studies programs, and provides opportunities for in the community. The course also has links with other CTS strands, including Agriculture, Forestry and Tourism Studies.

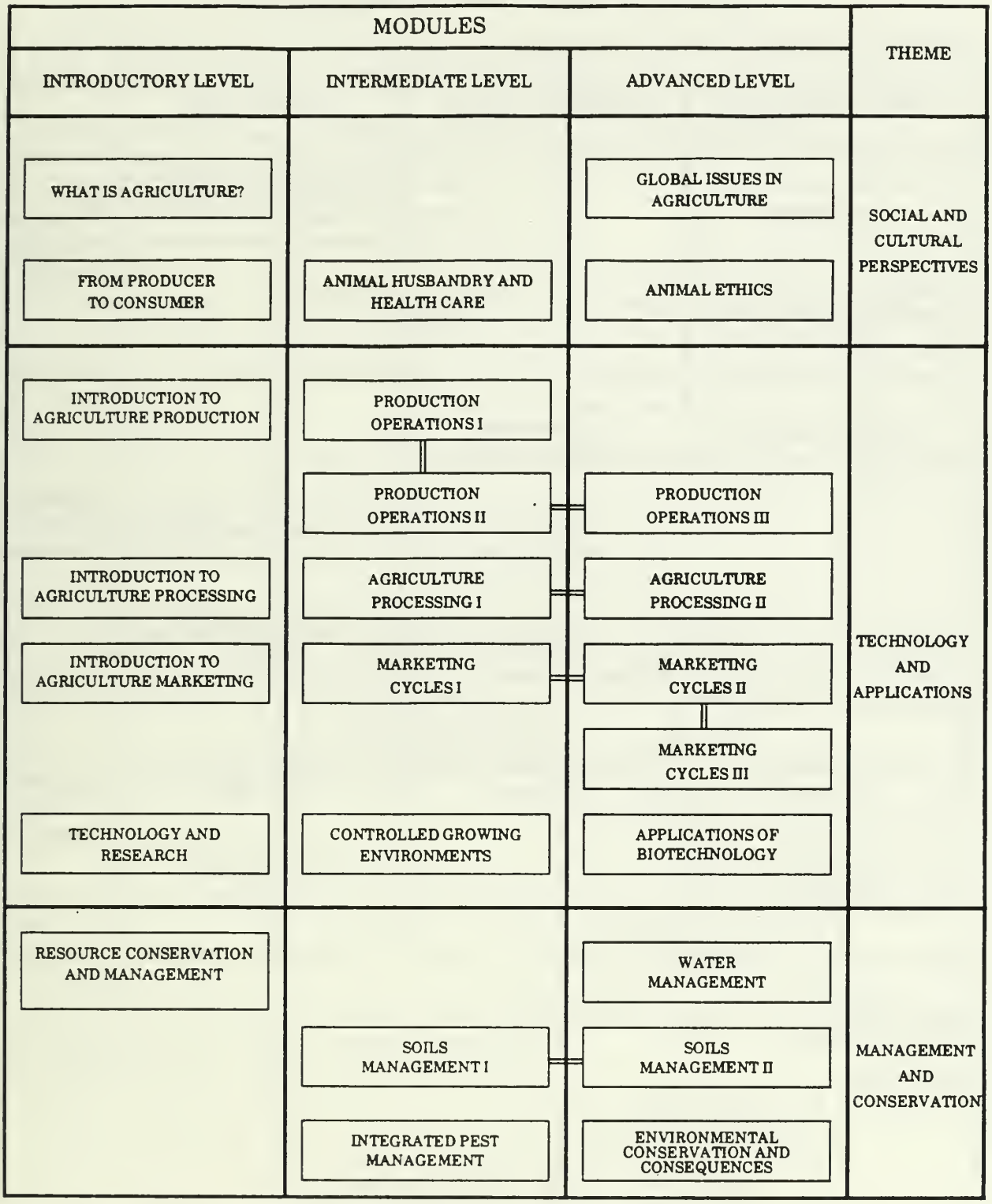
The scope and sequence charts outline modules within each strand that can be combined to form courses in Natural Resource Studies. Course planning should take into account the module sequences and prerequisites indicated in each chart.

LINKAGES

Courses in Natural Resource Studies may be designed by:

- combining modules from one or more of the strands (e.g., Agriculture, Energy and Mines, Forestry, Wildlife)
- combining modules in Natural Resource Studies with modules from other CTS strands.

AGRICULTURE SCOPE AND SEQUENCE



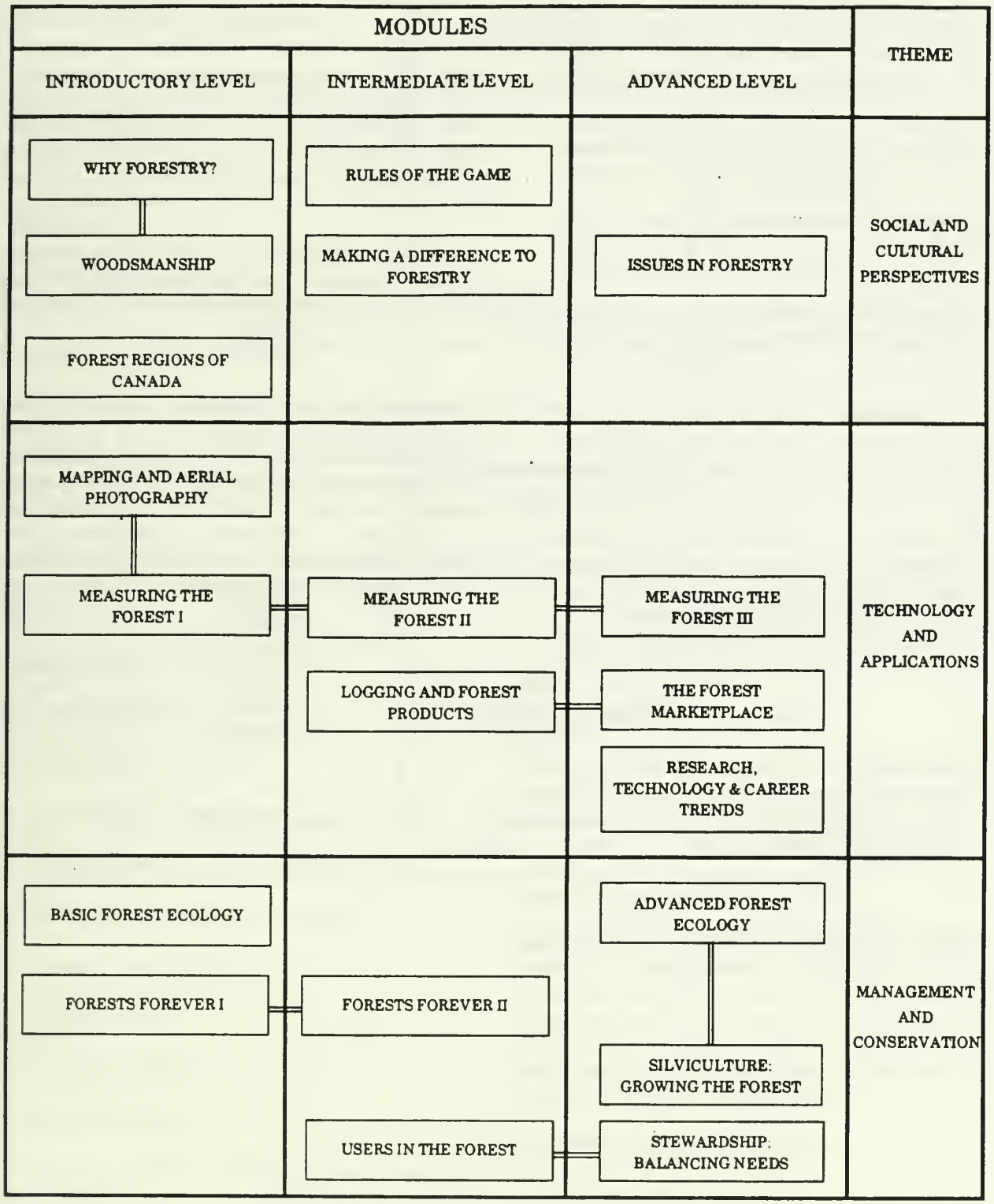
═══ Double solid line indicates module sequences and prerequisites.

ENERGY AND MINES SCOPE AND SEQUENCE

MODULES			THEME
INTRODUCTORY LEVEL	INTERMEDIATE LEVEL	ADVANCED LEVEL	
TAKING INVENTORY		THE ENERGY-ENVIRONMENT CONNECTION	SOCIAL AND CULTURAL PERSPECTIVES
APPLICATIONS OF ENERGY AND MINERALS			
ENERGY FROM WASTE	NON-RENEWABLE TECHNOLOGIES		TECHNOLOGY AND APPLICATIONS
	RENEWABLE TECHNOLOGIES	ALTERNATIVE FUELS	
	MINERAL TECHNOLOGY	MARKETING TRENDS & ISSUES	
THE CONSERVATION CHALLENGE	LOW ENERGY DESIGNS AND SYSTEMS I	LOW ENERGY DESIGNS AND SYSTEMS II	MANAGEMENT AND CONSERVATION
FUNDAMENTALS OF RECYCLING		ALTERNATIVE ENERGY PATHS	

═══ Double solid line indicates module sequences and prerequisites.

FORESTRY SCOPE AND SEQUENCE



═══ Double solid line indicates module sequences and prerequisites.

WILDLIFE SCOPE AND SEQUENCE

MODULES			THEME
INTRODUCTORY LEVEL	INTERMEDIATE LEVEL	ADVANCED LEVEL	
WHAT IS WILDLIFE?			SOCIAL AND CULTURAL PERSPECTIVES
WILDLIFE AND OUTDOOR EXPERIENCES	MEASURING THE VALUE OF WILDLIFE	MAKING A DIFFERENCE TO WILDLIFE	
	WILDLIFE SPACES AND SPECIES	WILDLIFE RESEARCH	TECHNOLOGY AND APPLICATIONS
NATURAL HISTORY OF ALBERTA WILDLIFE		WILDLIFE MANAGEMENT I	MANAGEMENT AND CONSERVATION
	INTERACTIONS OF WILDLIFE AND SOCIETY	WILDLIFE MANAGEMENT II	
OUR WILDLIFE— OUR RESPONSIBILITY	ISSUES IN WILDLIFE I	ISSUES IN WILDLIFE II	

═══ Double solid line indicates module sequences and prerequisites.

C. CURRICULUM AND ASSESSMENT STANDARDS

CURRICULUM STANDARDS

Curriculum standards are expressed through learner expectations, which describe the competencies that students are to develop. They require students to be active learners who can combine knowledge, skills and attitudes within an applied context.

Learner expectations are categorized in three, progressively detailed stages: strand, module and specific learner expectations.

Strand Learner Expectations

Strand learner expectations serve as the foundation for the module and specific learner expectations. They comprise the knowledge, skills, attitudes, motivation and commitment to work individually and collectively, as citizens and community members, toward the conservation and responsible use of water, land, air, forests and wildlife. Specific competencies include:

- critical and creative thinking
- communication
- enterprise and design
- goal setting and planning
- negotiation/consensus building
- problem solving/decision making
- research and organization
- responsibility
- self-management
- team building.

In order to achieve these competencies, *the student will*:

- develop greater awareness of the economic, environmental and social significance of natural resources in Alberta and the rest of the world, and the benefits and costs of resource development
- describe relationships among production, processing and marketing systems within our natural resource industries
- monitor technologies and research programs designed to develop, conserve, protect and enhance the productivity of our resource base
- translate development and conservation goals into viable plans for managing the use of natural resources
- develop competencies and behaviours that have broad application to environmental career paths, and specific application to careers within natural resource industries
- develop a more positive self-concept and increased understanding of personal interests, values, aptitudes and abilities, so as to enter the world of work or further education programs with increased confidence and success.

Module Learner Expectations

Module learner expectations are applications of the strand learner expectations. They describe what the student should know and be able to do to successfully complete the module.

Specific Learner Expectations

Specific learner expectations define the scope of learning. They provide a blueprint that helps students achieve the module learner expectations and teachers organize for instruction. Specific learner expectations for each strand in Natural Resource Studies are identified on pages 13 through 202.

ASSESSMENT STANDARDS

Assessment standards describe the conditions and criteria for determining whether or not a student's performance meets the required standards.

Assessment standards will be supported by assessment tools such as exemplars (print, product and video), performance checklists and appraisal work sheets.

The emphasis for each assessment standard will help teachers determine time allotment and student grades.

MODULE AGR101: WHAT IS AGRICULTURE?

Level: **Introductory**

Theme: **Social and Cultural Perspectives**

The agriculture industry involves people in both rural and urban communities, and affects the quality of life enjoyed by all Albertans. This module introduces students to the nature of agriculture—its scope, diversity and significance in society.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • develop an awareness of the diversity of agricultural activity in Alberta, Canada and the global community.	*The student will:* • outline the broad field of agriculture and related industries by citing examples of: – urban and rural production operations – processing systems and value-added products – marketing and distribution systems – business and labour providing inputs and services – community services and government agencies serving agriculture.	30
• develop an appreciation of the economic, social and environmental significance of agriculture.	• list ways in which agricultural activity has affected social and cultural values, environmental factors and economic viability within the local community • collect news articles that portray how personal choices regarding food, clothing and lifestyle, and the position taken on related issues may affect the agriculture industry • make predictions about future trends in agriculture that are based upon consumer needs and wants, changing world markets, developments in technology and environmental stewardship.	40
• investigate career paths within the agriculture industry.	• present the results of research on one or more career paths in agriculture/ horticulture, including information about: – nature of the job/working conditions – entry requirements/competencies – educational/training opportunities – opportunity for advancement – opportunity for self-employment and entrepreneurship.	30

MODULE AGR101: WHAT IS AGRICULTURE? (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Diversity	*The student will:* • explain the function of subsistence agriculture and commercial agriculture • compare and contrast agricultural activities in rural and urban areas; e.g.: – scale of industry – labour requirements – type of commodity produced – market opportunities – degree of mechanization • examine production and consumption patterns of agricultural products at local, national and international levels • identify evolving and emerging forms of agriculture that have potential to provide aesthetic, emotional, economic and health benefits; e.g.: – food and textiles – industrial applications – greenhouse production – interior plantscape and landscape – animal husbandry and health care • identify business/labour that provides inputs and services to agriculture • describe the function of community services and government agencies serving agriculture.
Economic, Social and Environmental Significance	• relate consumer needs and wants to a rationale for the exchange of agricultural goods and services at local, national and global levels • examine the flow of agricultural goods and services between Canada and other nations, and its impact on the national economy • assess the impact of agriculture on material and conservation goals, and on other quality of life factors; e.g.: – rural and urban development – sustainable food supply – use of natural resources – lifestyle • compile a list of technological developments affecting or likely to affect agriculture

MODULE AGR101: WHAT IS AGRICULTURE? (continued)

Concept	Specific Learner Expectations
Economic, Social and Environmental Significance (continued)	*The student will:* • consider the importance of sustainable production systems in meeting societal needs for food and other amenities, conserving natural resources and enhancing the quality of the environment • assess the impact of choices and decisions made by citizens on the agriculture industry; e.g.: – selection of foods and textiles – use of land and/or chemicals – position on animal rights – support given to development and research.
Career Paths	• outline career clusters and the range of occupational opportunities within the agriculture/horticulture industry; e.g.: – science/production management – processing (food/fibre/industrial/horticultural) – marketing /distribution and retail services – support services – resource management • compare and contrast career opportunities in rural and urban areas • gather employment statistics within one or more career clusters; e.g.: – types of careers – number of workers – employment trends • infer career opportunities and trends from employment statistics • gather information regarding agriculture/horticulture industries in the future, and resulting career opportunities.

MODULE AGR102: FROM PRODUCER TO CONSUMER

Level: **Introductory**

Theme: **Social and Cultural Perspectives**

This module enables students to survey production, processing and marketing systems within a rural or urban agriculture industry. Following a case study approach, students will examine various factors that affect decision making within an agricultural or horticultural venture, and develop an appreciation of how consumer choices influence practices within the industry.

Note: This module may be included in the student's program more than once if curriculum and assessment standards are applied to different agriculture industries. Ideally, students will survey the production, processing and marketing of both a plant and an animal commodity.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • identify critical factors that influence decision making within a rural or urban agriculture/ horticulture industry.	*The student will:* • portray a rural or urban agriculture/ horticulture industry using a combination of written and visual methods, and identify factors that influence practices and decision making within the industry.	20
• trace the sequence of steps required to convert a plant or animal product into a consumer product.	• construct a flow chart that illustrates stages in the production, processing and marketing of an agricultural/horticultural commodity • list the range of careers, occupations and networks involved in producing, processing and marketing a plant or animal commodity.	40
• investigate potential markets and marketing systems for an agricultural/horticultural product or service.	• model an approach used to market an agricultural/horticultural product or service.	20
• develop an understanding of how agricultural/horticultural markets are expanded, and existing products and services are altered to meet the needs of new markets..	• devise and present a plan for expanding market opportunities, altering an existing agricultural/horticultural product or service, or developing a new product or service.	20

MODULE AGR102: FROM PRODUCER TO CONSUMER (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Critical Factors	*The student will:* • identify environmental factors that support or inhibit activities within a rural or urban agriculture industry • assess the impact of decisions regarding the use of land, water and air on the industry; e.g.: – urbanization – resource development/conservation – environmental stewardship – water quality and quantity – sewage treatment – cloud seeding – environmental emission – preserves and natural area • explain the role of developing technologies and financial resources in an agricultural/horticultural venture • gather information about government policies, programs and standards and their effects on an agriculture/horticulture industry.
Product Networks	• outline the stages and steps involved in producing a plant or animal commodity • classify and sequence the steps required to move an agricultural/ horticultural commodity from producer to consumer; e.g.: – transportation – processing – grading – packaging – storing – merchandising • identify materials and services that are used at each stage of production, processing and marketing; e.g.: – human resources – natural resources – technology – energy – transportation and storage – inspection and regulation.

MODULE AGR102: FROM PRODUCER TO CONSUMER (continued)

Concept	Specific Learner Expectations
Marketing Systems	*The student will:* • explain marketing as the process of bringing buyer and seller together • describe potential local, national and international markets for an agricultural/horticultural product or service • identify and compare marketing alternatives, including free market systems, supply managed systems, marketing boards and cooperatives • identify and describe basic components of marketing an agricultural/horticultural product or service; e.g.: – commodity market information – packaging and labelling – pricing – distribution – advertising and sales.
Product Development	• consider factors that influence consumer trends and the development of new markets for an existing product or service; e.g.: – social and demographic – economic – environmental • identify market opportunities that arise from specialization, international trade and participation in a global economy • outline market conditions leading to, and steps in altering an existing agricultural/horticultural product or service, or developing a new product or service.

MODULE AGR103: INTRODUCTION TO AGRICULTURE PRODUCTION

Level: **Introductory**

Theme: **Technology and Applications**

This module will enable students to study production activities within an agricultural or horticultural enterprise. Students will examine practices involved in producing a plant or animal commodity, and related career opportunities in rural and urban areas.

Note: The module may be included in the student's program more than once if curriculum and assessment standards are applied to the production of different commodities.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • examine basic requirements and management techniques involved in producing a plant or animal commodity.	*The student will:* • outline basic requirements and management techniques that are involved in producing a plant or animal commodity, including information about: – rural or urban land requirements – appropriate buildings, structures and equipment – selection and breeding principles – factors to consider in health protection – basic business management functions.	75
• investigate career paths related to producing an agricultural/ horticultural commodity.	• present the results of research on one or more career paths that involve producing an agricultural/horticultural commodity, including information about: – nature of the job/working conditions – entry requirements/competencies – educational/training opportunities – opportunity for advancement – opportunity for self-employment and entrepreneurship.	25

MODULE AGR103: INTRODUCTION TO AGRICULTURE PRODUCTION (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Production	*The student will:* • consider the capability of a particular piece of land to support production; e.g.: – water supply – type of soil – climate – space variables – nutrient requirements • outline a strategy for protecting the health of a chosen commodity; e.g.: – identification of diseases, deficiencies, ailments and other factors that limit production – treatment, control and prevention • relate concepts of breeding and selection to production of a plant or animal commodity; e.g.: – systems of breeding – selection criteria – genetic engineering • describe buildings, structures and equipment appropriate to production; e.g.: – design considerations – operation and maintenance – safety – economics/cost • identify basic business management functions as they relate to production; e.g.: – record keeping – handling risk and uncertainty.
Career Paths	• outline career clusters related to producing an agricultural/ horticultural commodity; e.g.: – science/production management – support services – resource management • gather employment statistics within one or more career clusters; e.g.: – types of careers – number of workers – employment trends

MODULE AGR103: INTRODUCTION TO AGRICULTURE PRODUCTION (continued)

Concept	Specific Learner Expectations
Career Paths (continued)	*The student will:* • infer career opportunities and trends from employment statistics • gather information regarding agriculture/horticulture production industries in the future, and resulting career opportunities.

MODULE AGR104: INTRODUCTION TO AGRICULTURE PROCESSING

Level: **Introductory**

Theme: **Technology and Applications**

This module will enable students to study processing activities within an agricultural or horticultural enterprise. Students will examine practices involved in processing a plant or animal commodity, and related career opportunities in rural and urban areas.

Note: The module may be included in the student's program more than once if curriculum and assessment standards are applied to the processing of different commodities.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • trace the steps in processing, packaging, transporting and storing a plant or animal commodity.	*The student will:* • demonstrate procedures that are used to process, package, transport and store a plant, animal or value-added product with emphasis on: – inputs to the product – steps in producing the commodity or value-added product – appropriate buildings, structures and equipment – safety and quality control – basic business management functions.	75
• investigate career paths related to processing an agricultural/ horticultural commodity.	• present the results of research on one or more career paths that involve processing an agricultural/horticultural commodity, including information about: – nature of the job/working conditions – entry requirements/competencies – educational/training opportunities – opportunity for advancement – opportunity for self-employment and entrepreneurship.	25

MODULE AGR104: INTRODUCTION TO AGRICULTURE PROCESSING (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Processing	*The student will:* • identify steps that are followed in processing and packaging a plant or animal commodity; e.g.: – inputs to the product – producing the commodity – safety and quality control – product identification and grading – label requirements • identify different methods of transportation and storage; e.g.: – trucks, railways, airlines – containerization,bulk handling • outline a strategy for maintaining the quality of a chosen commodity during transportation and storage; e.g.: – parameters of quality – control measures • describe buildings, structures and equipment appropriate to processing, transportation and/or storage; e.g.: – design considerations – operation and maintenance – safety – economics, cost • identify basic business management functions as they relate to processing; e.g.: – record keeping – managing input costs – environmental constraints.
Career Paths	• outline career clusters related to processing an agricultural/ horticultural commodity; e.g.: – food/fibre/industrial/horticultural – support services – resource management • gather employment statistics within one or more career clusters; e.g.: – types of careers – number of workers – employment trends • infer career opportunities and trends from employment statistics • gather information regarding agriculture/horticulture processing industries in the future, and resulting career opportunities.

MODULE AGR105: INTRODUCTION TO AGRICULTURE MARKETING

Level: **Introductory**

Theme: **Technology and Applications**

This module will enable students to study marketing activities within an agricultural or horticultural enterprise. Students will examine practices involved in marketing a plant or animal commodity, and related career opportunities in rural and urban areas.

Note: The module may be included in the student's program more than once if curriculum and assessment standards are applied to the marketing of different commodities.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • identify and assess various strategies that are used to market a plant or animal commodity.	*The student will:* • design and evaluate a strategy for marketing a plant, animal or value-added product that addresses: – commodity supply available for market – potential markets and marketing alternatives – factors that influence pricing – packaging alternatives and labelling requirements – product advertising and promotion – sales and distribution.	75
• investigate career paths related to marketing an agricultural/ horticultural commodity.	• present the results of research on one or more career paths that involve marketing an agricultural/horticultural commodity, including information about: – nature of the job/working conditions – entry requirements/competencies – educational/training opportunities – opportunity for advancement – opportunity for self-employment and entrepreneurship.	25

MODULE AGR105: INTRODUCTION TO AGRICULTURE MARKETING (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Marketing	*The student will:* • research local, national and international markets for a plant, animal or value-added product • identify and compare viable marketing alternatives for a plant, animal or value-added product; e.g.: – direct producer marketing – open markets – marketing boards – cooperatives • identify factors that influence pricing of the plant, animal or value-added product; e.g.: – cost factors – supply and demand – market competition • consider the effectiveness of different types of packaging; e.g.: – for consumer purposes – as a marketing tool • infer the impact of advertising on personal preferences and consumer decisions.
Career Paths	• outline career clusters related to marketing an agricultural/ horticultural commodity; e.g.: – market survey – advertising and promotion – distribution and retail services – product development – support services • gather employment statistics within one or more career clusters; e.g.: – types of careers – number of workers – employment trends • infer career opportunities and trends from employment statistics • gather information regarding agriculture/horticulture marketing in the future, and resulting career opportunities.

MODULE AGR202: PRODUCTION OPERATIONS I

Level: **Intermediate**

Theme: **Technology and Applications**

Production Operations I, II and III provide opportunities for students to conduct in-depth studies of production principles and applications within the context of an agricultural or horticultural industry. The module sequence offers flexibility in course planning, and will enable students to develop an understanding of practices used to produce an agricultural commodity or related amenity. Curriculum and assessment standards can be applied to one of the traditional, specialty or horticultural enterprises suggested below.

e.g.:

Traditional	Specialty	Horticultural
– beef	– aquaculture	– floristry
– cereal	– equine	– greenhouse
– diary	– exotic plants/animals	– interior plantscape
– forage	– game	– landscape
– oil seeds	– medicinal plants/animals	– nursery
– poultry	– mushrooms	– parks/golf course
– sheep	– pulses	– tree seedlings
– swine	– spices/herbs	
	– vegetables	

Note: Production Operations I may be included in the student's program more than once if curriculum and assessment standards are applied to different production enterprises.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • outline past and present trends in an agricultural or horticultural production industry.	*The student will:* •	20
• investigate the structure, function and life cycle of plants or animals produced within the industry.	•	40
• examine basic physical requirements essential to the growth and development of plants or animals within the industry.	•	40

MODULE AGR202: PRODUCTION OPERATIONS I (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Past and Present Trends	*The student will:* • consider reasons for producing an agricultural or horticultural commodity; e.g.: – subsistence – financial return – aesthetics – tradition – sense of achievement • outline past and present trends in producing the commodity; e.g.: – economic viability – consumer demands – globalization of markets – applications of technology – government involvement • survey production and consumption patterns within Alberta, Canada and the global community • analyze the economic and social significance of the industry at local, national and international levels • debate a current issue related to production activities within the industry; e.g.: – conduct research – develop a position – participate in debate.
Structure, Function and Life Cycle	• examine vital life processes as they relate to plants or animals produced within the industry; e.g.: – food/nutrient intake – respiration – digestion – waste excretion – movement – growth – reproduction • describe major anatomical structures and component parts within the plants or animals produced, and their function in performing vital life processes; e.g.: – roots, stems, leaves, flowers, seeds – feet, legs, body, neck, head

MODULE AGR202: PRODUCTION OPERATIONS I (continued)

Concept	Specific Learner Expectations
Structure, Function and Life Cycle (continued)	*The student will :* • infer relationships among anatomical structures, their functions, and the vital life processes they preform • identify stages in the life cycle of the plants or animals produced, and their significance in production practices.
Physical Requirements	• determine basic physical requirements for producing an agricultural or horticultural commodity; e.g.: – water – light, including intensity and length of day – temperature – air – space variables – nutrients • describe how weather and climate may affect production activities • examine the impact of land and soil characteristics on the growth and development of the plants or animals produced; e.g.: – topography – classification and physical features – composition and fertility – soil organisms • examine the impact of water quality and quantity on the production industry; e.g.: – physical, chemical and biological properties – the hydrologic cycle • examine strategies for managing the use of soil and water within the industry; e.g.: – soil management through crop rotation and tillage practices – limited-supply water management, including the use of wells, dugouts, irrigation and dams – excess-supply water management, including flood control and drainage techniques • investigate and debate current issues regarding the use of land, soil and/or water in producing a plant or animal commodity; e.g.: – single/multiple and rural/urban land use – soil erosion – use of fertilizer – water diversion – effluent disposal and pollution.

MODULE AGR203: PRODUCTION OPERATIONS II

Level: **Intermediate**

Theme: **Technology and Applications**

Prerequisite: **Production Operations I (AGR201)**

Production Operations I, II and III provide opportunities for students to conduct in-depth studies of production principles and applications within the context of an agricultural or horticultural industry. The module sequence offers flexibility in course planning, and will enable students to develop an understanding of practices used to produce an agricultural commodity or related amenity. Curriculum and assessment standards can be applied to one of the traditional, specialty or horticultural enterprises suggested below.

e.g.:

Traditional	Specialty	Horticultural
– beef	– aquaculture	– floristry
– cereal	– equine	– greenhouse
– diary	– exotic plants/animals	– interior plantscape
– forage	– game	– landscape
– oil seeds	– medicinal plants/animals	– nursery
– poultry	– mushrooms	– parks/golf course
– sheep	– pulses	– tree seedlings
– swine	– spices/herbs	
	– vegetables	

Note: Production Operations II may be included in the student's program more than once if module prerequisites are followed, and curriculum and assessment standards are applied to different production enterprises.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • examine opportunities for producing an agricultural or horticultural commodity.	*The student will:* •	30
• develop strategies for maintaining and protecting the health of plants or animals within the industry.	•	30
• investigate classification and identification procedures, and the importance of genetics in relation to plant or animal production.	•	40

MODULE AGR203: PRODUCTION OPERATIONS II (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Enterprise Selection	*The student will:* • explain how personal and intrinsic needs may influence enterprise selection; e.g.: – food for personal consumption – interest in aesthetics – personal motivation and aptitude • identify and assess factors that determine market demand for an agricultural or horticultural commodity; e.g.: – size and location of market – market access – market competition – market outlook • assess financial opportunities related to producing an agricultural or horticultural commodity; e.g.: – fixed and variable costs – forecast of returns – risk factors • examine land requirements, and the suitability of climatic, soil and water conditions to production operations • consider labour and transportation needs within the industry; e.g.: – availability – type – cost.
Health and Nutrition	• apply principles of nutrition to production practices within the industry; e.g.: – factors determining nutritional requirements – essential nutrients and their sources – function of macro-nutrients and micro-nutrients – correcting excesses and deficiencies – ration/fertilizer formulation • examine the use of fertilizers and food supplements in maintaining the health of the plants or animals produced; e.g.: – function of fertilizers and food supplements – comparison of organic and inorganic sources – nutrient cycling – safe methods of application – potential impact on water and soil – analysis of cost and net return

MODULE AGR203: PRODUCTION OPERATIONS II (continued)

Concept	Specific Learner Expectations
Health and Nutrition (continued)	*The student will:* • describe the symptoms, treatment and prevention of major pests, diseases and ailments that affect the health of plants or animals within the industry; e.g.: – identification, symptoms and treatment – a comparison of cultural, mechanical, biological and chemical methods of control – safe application of appropriate control measures • consider other methodologies important in maintaining plant or animal health; e.g.: – crop management practices, including crop rotation, tillage, pest control and the use of amendments – animal management practices, including housing, sanitation, handling and vaccination • identify potential hazards and safe practices in managing the health of plants or animals within the industry • investigate and debate current issues regarding health management practices and sustainable production systems; e.g.: – organic and inorganic amendments – biological and chemical control measures – animal rights and animal welfare – food safety and consumer confidence.
Taxonomy and Genetics	• apply systems of classification and identification to plants or animals produced within the industry; e.g.: – plant/animal taxonomy – variety/breed identification • explain heredity principles and their application to the plants or animals produced; e.g.: – dominant and recessive traits – selection criteria and procedures – reproductive systems – systems of breeding, including inbreeding, linebreeding, crossbreeding and hybridization • examine reproductive technologies used in producing a plant or animal commodity; e.g.: – techniques of asexual and sexual plant propagation – artificial insemination, embryo transfer and other developments in biotechnology • outline procedures used to maintain the quality of plants or animals within the industry; e.g.: – selection criteria and regulations – purpose of showing and judging – grading systems and standards – importance of record keeping and record systems.

MODULE AGR204: AGRICULTURE PROCESSING I

Level: **Intermediate**

Theme: **Technology and Applications**

Agriculture Processing I and II provide opportunities for students to conduct in-depth studies of value-added products within one of Alberta's agriculture or horticulture processing industries. The module sequence will enable students to develop knowledge of production techniques, quality and safety control, and product development within a processing sector. Curriculum and assessment standards can be applied to one of the processing industries suggested below.

e.g.:

Supply-Managed
- diary
- grain
- pork
- poultry
- sugar beet

Non-Regulated
- aquaculture
- distillery and wine
- ethanol
- exotic and specialty animals
- forage
- fruit and vegetables
- grain
- honey
- horticulture
- livestock

Note: Agriculture Processing I may be included in the student's program more than once if curriculum and assessment standards are applied to different processing industries.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • describe the nature of an agriculture processing industry in Alberta.	*The student will:* •	40
• examine applications of regulatory and management systems within the processing industry.	•	30
• explore career paths and the range of employment opportunities in processing an agricultural commodity or value-added product.	•	30

MODULE AGR204: AGRICULTURE PROCESSING I (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Nature of the Industry	*The student will:* • identify essential functions and the products developed within an agriculture processing industry in Alberta • describe inputs to processing within the industry; e.g.: – commodity inputs – financial resources – human and natural resources – technology • consider the impact of relevant supply management systems on commodity inputs; e.g.: – government regulations and constraints – board management systems • explain the stages and steps in processing the commodity or value-added product • examine transportation and storage requirements within the industry, and their impact on industry location and product costs • describe buildings, structures and equipment used in processing, transportation and storage; e.g.: – design considerations – operation and maintenance – safety standards – economics/cost.
Regulation and Management	• explain systems used to grade products within the industry • outline a strategy for maintaining the quality of a commodity or value-added product throughout processing, transportation and storage; e.g.: – parameters of quality – government and board regulations • describe product packaging and labelling requirements within the industry • identify safety concerns, regulations and standards within the industry • consider strategies for conducting basic business management functions within the industry; e.g.: – financial planning/record keeping – managing input costs – environmental constraints – product inspection and quality control.

MODULE AGR204: AGRICULTURE PROCESSING I (continued)

Concept	Specific Learner Expectations
Career Paths	*The student will:* • outline career clusters and the range of occupational opportunities related to processing an agricultural/horticultural commodity or value-added product; e.g.: – food and fibre industry – amenity agriculture – support services – resource management • gather employment statistics within one or more career clusters; e.g.: – types of careers – number of workers – employment trends • infer career opportunities and trends from employment statistics • gather information regarding agriculture/horticulture processing industries in the future, and resulting career opportunities • present the results of research on one or more career paths related to processing an agricultural/horticultural commodity or value-added product; e.g.: – nature of the job/working conditions – entry requirements/competencies – opportunity for advancement – opportunity for self-employment and entrepreneurship.

MODULE AGR205: MARKETING CYCLES I

Level: **Intermediate**

Theme: **Technology and Applications**

Marketing Cycles I, II and III provide opportunities for students to study general marketing principles and their application in an agrifood or horticulture industry, as well as specific marketing structures that are designed to influence the supply of a plant or animal commodity. The module sequence will enable students to develop knowledge of both regulated and non-regulated marketing systems within the agriculture industry. Curriculum and assessment standards can be applied to one of the traditional, speciality or horticultural enterprises suggested below.

e.g.:

Traditional	Specialty	Horticultural
– beef	– aquaculture	– floristry
– cereals	– exotic plants/animals	– greenhouse
– diary	– medicinal plants/animals	– interior plantscape
– forage	– mushrooms	– landscape
– oil seeds	– pulses	– nursery
– poultry	– spices/herbs	
– sheep	– vegetables	
– swine		

Note: Marketing Cycles I focuses attention on general marketing principles and their application in the marketing of a commodity, product or service. This module may be included in the student's program more than once if curriculum and assessment standards are applied to different enterprises.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • outline the general function and characteristics of marketing within an agrifood or horticulture industry.	*The student will:* •	40
• examine opportunities and changes in domestic and international markets.	•	40
• explore career paths and the range of employment opportunities in marketing a commodity, product or service.	•	20

MODULE AGR205: MARKETING CYCLES I (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Marketing Principles	*The student will:* • explain the goals of marketing an agricultural/horticultural commodity, product or service; e.g.: – market position and profit margin – image creation and industry strength – price discovery – product exposure • illustrate the laws of supply and demand, and factors that cause changes in supply, demand and pricing of the commodity, product or service; e.g.: – imports and exports – environmental factors – consumer choices – economic conditions • examine competition in both domestic and international markets, and barriers/restrictions on free trade; e.g.: – cultural, ethical, political, legal – economic systems – international organizations – trade agreements • identify sources of market information relevant to the commodity, product or service; e.g.: – data base – private consultation • compare and contrast potential strategies that might be used to distribute the product or service in the marketplace; e.g.: – extensive (open) – selective (niche) – exclusive (franchise) • describe the stages through which the agricultural/horticultural product moves en route to the consumer; e.g.: – inputs assembly – processing – brokering of product.

MODULE AGR205: MARKETING CYCLES I (continued)

Concept	Specific Learner Expectations
Market Development	*The student will:* • consider one or more strategies that may be used to promote an agricultural/horticultural commodity, product or service: e.g.: – advertising – personal sales – telemarketing – display – in-store samples – trade shows • assess opportunities for the global marketing of the commodity, product or service; e.g.: – the United States and Mexico – nations of the Pacific Rim – other developing nations • explain the role of market research and product development in adapting the commodity, product or service to meet present and future market needs; e.g.: – consumer polls – surveys – focus groups • consider factors that influence consumer preferences and the development of new products and markets within the industry; e.g.: – ethical, cultural, religious – demographic – environmental – economic • outline market conditions leading to, and steps in altering the product or service, or developing a related product or service.
Career Paths	• outline career clusters and the range of occupational opportunities related to marketing an agricultural/horticultural commodity, product or service; e.g.: – farm gate market services – wholesale/retail services – distribution and transportation – market research and analysis – product development – advertising and promotion • gather employment statistics within one or more career clusters; e.g.: – type of careers – number of workers – employment trends

MODULE AGR205: MARKETING CYCLES I (continued)

Concept	Specific Learner Expectations
Career Paths (continued)	*The student will:* • infer career opportunities and trends from employment statistics • gather information regarding agriculture/horticulture industries in the future, and resulting career opportunities in marketing • present the results of research on one or more career paths related to marketing an agricultural/horticultural commodity, product or service; e.g.: – nature of the job/working conditions – entry requirements/competencies – education/training opportunities – opportunity for advancement – opportunity for self-employment and entrepreneurship.

MODULE AGR303: PRODUCTION OPERATIONS III

Level: **Advanced**

Theme: **Technology and Applications**

Prerequisite: **Production Operations II (AGR203)**

Production Operations I, II and III provide opportunities for students to conduct in-depth studies of production principles and applications within the context of an agricultural or horticultural industry. The module sequence offers flexibility in course planning, and will enable students to develop an understanding of practices used to produce an agricultural commodity or related amenity. Curriculum and assessment standards can be applied to one of the traditional, specialty or horticultural enterprises suggested below.

e.g.:

Traditional	Specialty	Horticultural
- beef	- aquaculture	- floristry
- cereal	- equine	- greenhouse
- diary	- exotic plants/animals	- interior plantscape
- forage	- game	- landscape
- oil seeds	- medicinal plants/animals	- nursery
- poultry	- mushrooms	- parks/golf course
- sheep	- pulses	- tree seedlings
- swine	- spices/herbs	
	- vegetables	

Note: Production Operations III may be included in the students program more than once if module prerequisites are followed, and curriculum and assessment standards are applied to different production enterprises.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • examine current issues and trends related to production practices within an agricultural or horticultural industry.	*The student will:* •	50
• describe buildings, structures and equipment used in producing plants or animals within the industry.	•	25
• develop strategies for managing production activities within the industry.	•	25

MODULE AGR303: PRODUCTION OPERATIONS III (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Issues and Trends	*The student will:* • consider differing points of view regarding production practices within an agricultural or horticultural industry; e.g.: – land, soil and water use – applications of biotechnology – use of chemicals – animal ethics – protein efficiency • analyze issues regarding the conservation of land, soil and water • compare and contrast production issues in Alberta and Canada with similar issues in other parts of the world • examine ways in which government regulations, policies and guidelines may influence production • assess the impact of social, economic and environmental trends on production practices within the industry; e.g.: – international trade and global competition – trade liberalization – rural and farm populations – food safety and consumer confidence – support for research and development – greenhouse effect and changing world climates – environmental stewardship and sustainable development • forecast future production on the basis of current issues and trends.
Buildings, Structures and Equipment	• examine the range of buildings and structures that are used in producing plants or animals within the industry; e.g.: – fences and cold frames – greenhouses and totally confined rearing buildings • identify types of equipment that are used at each stage of production within the industry; e.g.: – production equipment used in seeding/planting, tillage, water/feed distribution and harvest – handling equipment, such as trucks, tractors, conveyors and augers • consider criteria relevant to the selection and/or design of buildings, structures and equipment; e.g.: – function, operation and maintenance – safety and efficiency – ethical, legal and environmental factors – economic and cost • identify potential hazards and safe practices related to the use of buildings, structures and equipment within the industry.

MODULE AGR303: PRODUCTION OPERATIONS III (continued)

Concept	Specific Learner Expectations
Production Management	*The student will:* • demonstrate an understanding of basic business principles used to manage production activities within the industry; e.g.: – financial record keeping – the use and sources of credit – dealing with risk and uncertainty – tax implications • establish criteria and techniques for maintaining a sustainable production system; e.g.: – management practices related to soil fertility and conservation – management practices related to water quality and the hydrologic cycle • incorporate legal considerations into plans for managing production activities; e.g.: – environmental constraints – inspection, regulation and quality control.

MODULE AGR304: AGRICULTURE PROCESSING II

Level: **Advanced**

Theme: **Technology and Applications**

Prerequisite: **Agriculture Processing I (AGR204)**

Agriculture Processing I and II provide opportunities for students to conduct in-depth studies of value-added products within one of Alberta's agriculture or horticulture processing industries. The module sequence will enable students to develop knowledge of production techniques, quality and safety control, and product development within a processing sector. Curriculum and assessment standards can be applied to one of the processing industries suggested below.

e.g.:

Supply-Managed	Non-Regulated
– diary	– aquaculture
– grain	– distillery and wine
– pork	– ethanol
– poultry	– exotic and specialty animals
– sugar beet	– forage
	– fruit and vegetables
	– grain
	– honey
	– horticulture
	– livestock

Note: Agriculture Processing II may be included in the student's program more than once if module prerequisites are followed, and curriculum and assessment standards are applied to different processing industries.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will:	*The student will:*	
• examine government legislation and controls within an agriculture processing industry in Alberta.	•	30
• analyze the impact of the processing industry on the natural resource base and the environment.	•	30
• consider forecasts and future directions within the processing industry, and opportunities for product research and development.	•	40

MODULE AGR304: AGRICULTURE PROCESSING II (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Legislation and Controls	*The student will:* • identify the roles and responsibilities of relevant government agencies in managing product supply, quality and safety within a processing industry; e.g.: – Agriculture Canada – Alberta Agriculture – Consumer and Corporate Affairs • compare and contrast supply-managed processing systems with non-regulated processing systems; e.g.: – commodity supply, quality and pricing – access to regional, national and international markets – restrictions on imports and exports • describe relevant supply management systems and strategies used within the industry; e.g.: – marketing boards and cooperatives – quota systems and monopolies • consider potential applications of the International Standards Organization (ISO) in regulating industry practices.
Environmental Impact	• identify environmental factors that affect the viability of the processing industry; e.g.: – water – land and soil – weather and climate • examine the impact of processing practices on natural resources and the environment; e.g.: – effluent disposal and pollution – water diversion – use of chemicals – land use practices • analyze issues regarding the impact of processing on sustainable agriculture systems • identify laws and regulations within the industry that are intended to sustain the natural resource base and foster stewardship of the environment.

MODULE AGR304: AGRICULTURE PROCESSING II (continued)

Concept	Specific Learner Expectations
Forecasts and Opportunities	*The student will:* • identify factors that influence future directions within the processing industry; e.g.: – domestic and export market opportunities – consumer tastes and preferences – language and cultural behaviour – business practices – government trade policies • examine opportunities for product research and development within the industry; e.g.: – altering existing products – developing new products – introducing new markets • make predictions regarding future trends within the industry; e.g.: – production techniques and operations – products and markets – employment opportunities.

MODULE AGR305: MARKETING CYCLES II

Level: **Advanced**

Theme: **Technology and Applications**

Prerequisite: **Marketing Cycles I (AGR205)**

Marketing Cycles I, II and III provide opportunities for students to study general marketing principles and their application in an agrifood or horticulture industry, as well as specific marketing structures that are designed to influence the supply of a plant or animal commodity. The module sequence will enable students to develop knowledge of both regulated and non-regulated marketing systems within the agriculture industry. Curriculum and assessment standards can be applied to one of the traditional, specialty or horticultural enterprises suggested below.

e.g.:

Traditional	Specialty	Horticultural
– beef	– aquaculture	– floristry
– cereals	– exotic plants/animals	– greenhouse
– diary	– medicinal plants/animals	– interior plantscape
– forage	– mushrooms	– landscape
– oil seeds	– pulses	– nursery
– poultry	– spices/herbs	
– sheep	– vegetables	
– swine		

Note: Marketing Cycles II provides opportunities for students to simulate or implement a plan for marketing an agricultural commodity, product or service. This module may be included in the student's program more than once if module prerequisites are followed, and curriculum and assessment standards are applied to different marketing ventures.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • identify market opportunities within an agricultural/ horticultural industry.	*The student will:* •	25
• develop and present a marketing plan for an agricultural/ horticultural product or service.	•	50
• simulate or implement the marketing plan, and assess strengths and weaknesses of the plan.	•	25

MODULE AGR305: MARKETING CYCLES II (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Market Opportunities	*The student will:* • identify possible markets for an agricultural/horticultural product or service; e.g.: – local – regional – national – international • relate market possibilities to trends, forecasts and competition in the marketplace • consider the potential impact of health and safety regulations on marketing the product or service • identify and describe appropriate steps in marketing the product or service; e.g.: – market research – product/service development – product/service promotion.
Developing a Marketing Plan	• establish short- and long-term goals for a marketing plan • determine the type of information to be gathered through market research; e.g.: – product/service – target market – price – promotion • develop plans for gathering market information; e.g.: – observation/interview – surveys – questionnaires – publications and journals • describe plans for developing the product or service; e.g.: – improving an existing product or service – developing a new product or service – introducing new markets for an existing product or service • develop plans for packaging and labelling the product or service; e.g.: – protection and preservation – promotion and shelf positioning – health and safety requirements

MODULE AGR305: MARKETING CYCLES II (continued)

Concept	Specific Learner Expectations
Developing a Marketing Plan (continued)	*The student will:* • develop plans for promoting the product or service; e.g.: – target market – unique selling points – cost/benefit factors • establish criteria to assess the marketing plan • present the marketing plan using oral and written presentation techniques.
Implementing the Marketing Plan	• simulate or implement the marketing plan; e.g.: – conduct market research – develop a marketable product or service – promote the product or service • assess outcomes of the marketing simulation or venture; e.g.: – review short- and long-term goals – summarize outcomes – assess strengths and weaknesses – suggest improvements • prepare written critiques of the marketing simulation or venture.

MODULE AGR306: MARKETING CYCLES III

Level: **Advanced**

Theme: **Technology and Applications**

Prerequisite: **Marketing Cycles II (AGR305)**

Marketing Cycles I, II and III provide opportunities for students to study general marketing principles and their application in an agrifood or horticulture industry, as well as specific marketing structures that are designed to influence the supply of a plant or animal commodity. The module sequence will enable students to develop knowledge of both regulated and non-regulated marketing systems within the agriculture industry. Curriculum and assessment standards can be applied to one of the traditional, specialty or horticultural enterprises suggested below.

e.g.:

Traditional	Specialty	Horticultural
– beef	– aquaculture	– floristry
– cereals	– exotic plants/animals	– greenhouse
– diary	– medicinal plants/animals	– interior plantscape
– forage	– mushrooms	– landscape
– oil seeds	– pulses	– nursery
– poultry	– spices/herbs	
– sheep	– vegetables	
– swine		

Note: Marketing Cycles III focuses attention on specific structures designed to regulate the marketing of an agricultural commodity, product or service. This module may be included in the student's program more than once if module prerequisites are followed, and curriculum and assessment standards are applied to the marketing of different commodities, products, services and regulatory structures.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • outline past and present trends in marketing an agricultural commodity, product or service.	*The student will:* •	20
• examine structures, policies and trade rules designed to regulate marketing activities within the industry.	•	50
• develop an understanding of factors affecting decisions to market the commodity, product or service.	•	30

MODULE AGR306: MARKETING CYCLES III (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Past and Present Trends	*The student will:* • provide a historical perspective on marketing an agricultural commodity, product or service • examine factors that have affected marketing practices within the industry; e.g.: – consumer trends – trade liberalization – globalization of markets – environmental concerns – subsidy polices • compare approaches used to market the commodity, product or service in Canada with approaches used in other nations; e.g.: – United States – nations of the Pacific Rim – Europe.
Structures, Policies and Trade Rules	• examine basic economic factors that affect marketing activities within the industry; e.g.: – law of supply and demand – price determination and the future's market – comparative advantage • explain the concept of supply management, and differences between non-regulated (open) and regulated (closed) marketing systems • examine the role and impact of regulatory systems and strategies used in marketing the commodity, product or service; e.g.: – marketing boards and cooperatives – quota systems and monopolies • identify marketing structures used to facilitate commodity exchange; e.g.: – Winnipeg Stock Exchange – Omaha Market Exchange • assess the impact of government policies and legislation on marketing activities within the industry; e.g.: – federal and provincial trade regulations – transportation policies

MODULE AGR306: MARKETING CYCLES III (continued)

Concept	Specific Learner Expectations
Structures, Policies and Trade Rules (continued)	*The student will:* • examine the function of income support programs and subsidies within the industry, and their affect on long- and short-term market trends; e.g.: – Gross Revenue Insurance Plan (GRIP) – Net Income Stabilization Account (NISA) – National Tripartite Stabilization Program (NTSP) • consider the influence of international trade agreements on marketing the commodity, product or service; e.g.: – General Agreement on Tariffs and Trade (GATT) – Canada–United States Free Trade Agreement (CUSTA) – North American Free Trade Agreement (NAFTA).
Marketing Decisions	• identify factors that influence decisions to market the commodity, product or service; e.g.: – commodity supply, quality and pricing – financial constraints, including capital, credit and cash flow – time constraints on perishable products – transportation requirements • suggest ways in which relevant trade policies and regulations may influence marketing decisions; e.g.: – international and domestic trade rules – transportation policies – income support programs and subsidies • consider strategies for gathering current market information; e.g.: – publications and journals – private consultation – radio and television – data base • identify and assess viable alternatives for marketing the commodity, product or service; e.g.: – marketing board – cooperative – direct sale.

MODULE ENM101: TAKING INVENTORY

Level: **Introductory**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • identify and describe the energy and mineral resources present in Alberta.	*The student will:* •	40
• explain the economic and social significance of energy and mineral resources.	•	40
• investigate career paths within the energy and mineral resource industries.	•	20

MODULE ENM101: TAKING INVENTORY (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Alberta's Energy and Mineral Resources	*The student will:* • compare renewable and non-renewable energy resources • identify, describe and locate on a map renewable energy resources available in Alberta; e.g.: – solar – wind – biomass – geothermal – water • identify, describe and locate on a map known reserves of non-renewable energy in Alberta; e.g.: – oil – natural gas – coal – nuclear fuels • identify, describe and locate on a map the main types of minerals found in Alberta; e.g.: – metals – non-metals – structural materials.
Economic and Social Significance	• identify major energy use sectors and describe energy use within each sector ; e.g.: – residential – commercial – industrial – transportation • examine applications of metallic, non-metallic and structural materials • outline trends in energy and mineral markets, and competition from a range of raw material substitutes • consider how the energy and mineral industries influence the local and national economy • describe the flow of energy and mineral resources between Canada and other nations; e.g.: – important export partners – contribution to world energy supply • infer the impact of energy and mineral industries on material and conservation goals, and on other quality of life factors.

MODULE ENM101: TAKING INVENTORY (continued)

Concept	Specific Learner Expectations
Career Paths	*The student will:* • outline career clusters and the range of occupational opportunities within the energy and/or mineral industries; e.g.: – production – processing – marketing and distribution – supplies and services – mechanization/engineering and technical support – resource management • gather employment statistics within one or more career clusters; e.g.: – types of career – number of workers – employment trends • infer career opportunities and trends from employment statistics • gather information regarding energy and/or mineral industries in the future, and resulting career opportunities.

MODULE ENM102: APPLICATIONS OF ENERGY AND MINERALS

Level: **Introductory**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • describe products and by-products derived from energy and mineral resources, and their applications in society.	*The student will:* •	40
• develop greater awareness of societal trends in energy and mineral use.	•	30
• assess the potential of various energy and mineral alternatives to meet our needs.	•	30

MODULE ENM102: APPLICATIONS OF ENERGY AND MINERALS (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Products and By-products	*The student will:* • distinguish between primary and secondary energy sources, and give examples of each • explain the role of primary energy sources in producing electricity and heat energy • identify and describe products and by-products derived from non-renewable energy resources; e.g.: – crude oil – natural gas – coal • identify and describe products and by-products derived from mineral resources; e.g.: – metals – non-metals – structural materials.
Societal Trends	• determine personal and societal energy needs and how these are met; e.g.: – space and water heating – heat for industrial processing – fuels for transportation – electricity • compile an inventory of energy sources, minerals and related products in daily use • describe historical trends in Alberta's energy and mineral industries and how these have influenced people and the economy • make predictions about our future energy and mineral industries; e.g.: – alternative energy sources – material substitutes – market competition and change.

MODULE ENM102: APPLICATIONS OF ENERGY AND MINERALS (continued)

Concept	Specific Learner Expectations
Energy and Mineral Alternatives	*The student will:* • compile a list of technological developments affecting or likely to affect energy and mineral production in Alberta • explain existing and potential applications of solar, wind, biomass, water and geothermal energy, and why solar and wind energy have the greatest potential for use in Alberta • explain existing and potential applications of coal, conventional oil and natural gas, heavy oil and oil sands in Alberta • infer the impact of renewable and non-renewable energy alternatives on people, the economy and the environment • assess the potential of energy and mineral alternatives to meet our present and future needs.

MODULE ENM104: THE CONSERVATION CHALLENGE

Level: **Introductory**

Theme: **Management and Conservation**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • consider the impacts of energy and mineral development on the environment.	*The student will:* •	25
• explain the need for energy and mineral conservation at personal, local and global levels.	•	25
• develop an understanding of individual and shared actions that encourage energy and mineral conservation.	•	50

MODULE ENM104: THE CONSERVATION CHALLENGE (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Environmental Impact	*The student will:* • explain how the extraction, development and consumption of fossil fuels and/or minerals can change the environment; e.g.: – land – water – atmosphere – wildlife • describe instances of environmental change and their affect on local populations; e.g.: – personal and public health – land use practices – employment trends • study different theories and make predictions regarding environmental change at global levels; e.g.: – deforestation – acid deposition – climate change • infer short-term and long-term benefits and costs related to the extraction, development and consumption of fossil fuels and/or minerals.
Need for Conservation	• describe major components of conservation; e.g.: – using less – relying more on renewable alternatives and material substitutes • provide justification for the conservation of energy and minerals; e.g.: – declining reserves – environmental impact • relate patterns and trends in energy and mineral consumption to economic goals; e.g.: – sustainable development – economic diversification/expansion • discuss the benefits of relying more on renewable energy sources, and conserving non-renewable energy sources for their ideal use and less damage to the environment • relate specific energy and mineral conservation practices to resources saved and benefits to society.

MODULE ENM104: THE CONSERVATION CHALLENGE (continued)

Concept	Specific Learner Expectations
Personal and Shared Actions	*The student will:* • devise a persona action plan that will conserve energy and minerals in the home, school and community; e.g.: – recycling and reusing – reducing water, heat and electrical consumption – transportation alternatives • plan, conduct and assess a school-wide campaign to increase awareness of conservation practices and environmental concerns; e.g.: – establish goals – plan and conduct – assess impact • debate an issue regarding resource development and the environment; e.g.: – conduct research – develop a position – participate in debate • develop consensus regarding a local issue involving the development and/or use of an energy or mineral resource; e.g.: – conduct research – generate alternatives – agree to a workable solution.

MODULE ENM201: NON-RENEWABLE TECHNOLOGIES

Level: Intermediate

Theme: Technology and Applications

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • describe the history, formation and use of non-renewable energy resources in Alberta.	*The student will:* •	20
• develop awareness of economic and environmental factors that influence the development of non-renewable energy resources.	•	10
• identify and describe extraction, refining, manufacturing and reclamation technologies used in the development of non-renewable energy resources.	•	50
• develop awareness of career opportunities in the field of non-renewable technologies.	•	20

MODULE ENM201: NON-RENEWABLE TECHNOLOGIES (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Alberta's Non-renewable Energy Resources	*The student will:* • identify and describe major events in the development of non-renewable energy resources in Alberta – oil (conventional crude and oil sands technology and by-products) – natural gas (processing, pipelining, major by-products) – coal (coal grading, mining methods, uses) • inventory and map the locations of non-renewable energy resources in Alberta (oil and oil sands, natural gas, coal) • compare and contrast geologic processes that produce major non-renewable energy resources in Alberta (oil and oil sands, natural gas, coal) • describe geologic formations in which Alberta's major non-renewable energy resources are found • describe the importance of non-renewable energy resources to Alberta's economy • identify and describe consumer applications of non-renewable energy resources in Alberta.
Environment–Economy Relationship	• identify and describe environmental issues associated with the development of Alberta's non-renewable energy resources • identify and describe technologies that have been developed to respond to environmental issues • consider how the cost of responding to environmental issues may impact the economic development of Alberta's non-renewable energy resources • compare and contrast the concepts of environment and economy trade-off and sustainable energy development.
Development Technologies	• identify and describe extraction technologies used in the development of Alberta's non-renewable energy resources • identify and describe refining and manufacturing technologies used in the development of Alberta's non-renewable energy resources • identify and describe reclamation technologies used in the development of Alberta's non-renewable energy resources • trace the history of one technology used in developing Alberta's non-renewable energy resources.

MODULE ENM201: NON-RENEWABLE TECHNOLOGIES (continued)

Concept	Specific Learner Expectations
Career Opportunities	*The student will:* • identify and describe technology careers associated with the development of non-renewable energy resources • identify and describe academic requirements and occupational skills required to undertake a chosen technological career • assess current employment opportunities in a chosen career path • infer the likelihood of future employment in technology careers associated with non-renewable energy resources.

MODULE ENM202: RENEWABLE TECHNOLOGIES

Level: Intermediate

Theme: Technology and Applications

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • assess the potential of different sources of renewable energy to meet our needs.	*The student will:* •	20
• describe applications of renewable energy technologies.	•	50
• assess the benefits of renewable energy technologies in forging a context for sustainable energy development.	•	10
• develop awareness of career opportunities in the field of renewable technologies.	•	20

MODULE ENM202: RENEWABLE TECHNOLOGIES (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Our Energy Needs	*The student will:* • identify and describe renewable energy sources currently used in Alberta • locate on a map parts of the province that use renewable energy technologies; e.g.: – hydroelectric – solar – wind – biomass • describe renewable sources of energy not currently used in Alberta • consider the potential of non-renewable sources of energy to meet future energy demands • identify and describe obstacles to the use of renewable energy; e.g.: – technological – social – economic – environmental • compare and contrast use of renewable energy in Alberta with other parts of the world; e.g.: – California – Australia – Israel.
Renewable Energy Technologies	• examine applications of renewable energy technologies • plan and design a community that uses renewable energy technologies • make predictions regarding the replacement of non-renewable energy technologies by renewable energy technologies.
Sustainable Energy Development	• define sustainable energy development • compare the role of renewable and non-renewable energy technologies within the context of sustainable energy development • assess potential impacts of renewable energy technologies on the environment.

MODULE ENM202: RENEWABLE TECHNOLOGIES (continued)

Concept	Specific Learner Expectations
Career Opportunities	*The student will:* • outline career clusters and a range of occupational opportunities associated with renewable energy technologies • develop a profile for a chosen career in renewable energy technologies : – job description/working conditions – entry requirements/competencies – educational/training opportunities – opportunities for advancement – opportunities for self-employment and entrepreneurship • infer career opportunities and trends from projected growth in the renewable energy resource area.

MODULE ENM203: MINERAL TECHNOLOGY

Level: **Intermediate**

Theme: **Technology and Applications**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • describe the history, formation and use of mineral resources in Alberta.	*The student will:* •	20
• develop awareness of economic and environmental factors that influence the development of mineral resources.	•	10
• identify and describe extraction, refining, manufacturing and reclamation technologies associated with the development of mineral resources.	•	50
• develop awareness of career opportunities in the field of mineral technologies.	•	20

MODULE ENM203: MINERAL TECHNOLOGY (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Alberta's Mineral Resources	*The student will:* • identify and describe major events in the development of mineral resources in Alberta – metallic (e.g., gold and other metals) – non-metallic (e.g., sulphur, peat, quartz, salts, sodium sulphate) – structural materials (e.g., cement, sand and gravel, clay products, lime, stone) • inventory and map the locations of mineral resources in Alberta • compare and contrast geologic processes that produce major mineral resources in Alberta (e.g., gold, sulphur, lime) • describe geologic formations in which Alberta's major mineral resources are found. • describe the importance of mineral resources to Alberta's economy • identify and describe consumer applications of mineral resources in Alberta.
Environment-Economy Relationship	• identify and describe environmental issues associated with the development of Alberta's mineral resources • identify and describe technologies that have been developed to respond to environmental issues • consider how the economic development of Alberta's mineral resources may be affected by the cost of responding to environmental issues • compare and contrast the concepts of environment and economy trade-off and sustainable development within the context of Alberta's mineral resources.
Development Technologies	• identify and describe extraction technologies used in developing Alberta's mineral resources • identify and describe refining and manufacturing technologies used in developing Alberta's mineral resources • identify and describe reclamation technologies used in developing Alberta's mineral resources • trace the history of one technology used in developing Alberta's mineral resources.

MODULE ENM203: MINERAL TECHNOLOGY (continued)

Concept	Specific Learner Expectations
Career Opportunities	*The student will:* • identify and describe careers associated with the development of mineral resources • identify and describe academic requirements and occupational skills required to undertake a chosen career • assess current employment opportunities in a chosen career path • infer the likelihood of future employment in careers associated with mineral resources.

MODULE ENM204: LOW ENERGY DESIGNS AND SYSTEMS I

Level: **Intermediate**

Theme: **Management and Conservation**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • analyze energy systems that are used in residential and workplace environments.	*The student will:* •	20
• demonstrate an understanding of the principles of energy efficiency and energy conservation.	•	10
• design energy efficient structures suitable for Alberta's climate.	•	70

MODULE ENM204: LOW ENERGY DESIGNS AND SYSTEMS I (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Energy Systems	*The student will:* • inventory energy use in a residential and/or workplace environment (e.g., school) • consider energy efficiency in a residential and/or workplace environment • establish a target level of energy efficiency and determine potential savings that may result from achieving this target • identify technologies that could be applied to reach the target level of energy efficiency.
Energy Efficiency and Energy Conservation	• compare the concepts of energy efficiency and energy conservation, considering: – applications of technology – economic and environmental factors – personal habits and societal attitudes – the finite nature of non-renewable energy resources.
Energy Efficient Structures	• identify an energy efficiency design problem that involves: – size of structure – use of the structure – topographic, geographic and climatic factors – target energy use – comfort and practical use of the design – design and construction cost limitation • investigate design technologies available to respond to the situation and limitations presented in the problem • examine existing structures that incorporate energy efficiency design suitable for Alberta's climate • design and construct a model of a structure that would respond to the problem established • compare and contrast the features of different energy efficient designs.

MODULE ENM301: THE ENERGY-ENVIRONMENT CONNECTION

Level: **Advanced**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • describe the environmental significance of energy and mineral development.	*The student will:* •	20
• describe the social and economic significance of energy and mineral development.	•	20
• plan and implement a personal action strategy that is based upon an environmentally sensitive lifestyle.	•	30
• plan and communicate a community action campaign that is based upon environmental awareness, energy conservation and energy efficiency.	•	30

MODULE ENM301: THE ENERGY–ENVIRONMENT CONNECTION (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Environmental Significance	*The student will:* • provide a historical perspective on the environmental significance of energy and mineral development. • identify and describe current relationships between energy and mineral development and the environment • describe remedial and reclamation activities undertaken in the energy and mineral industries to protect the environment; e.g.: – coal mine reclamation • identify government policy and regulation at provincial and national levels that focus on reducing the impact of energy and mineral development on the environment • assess the effectiveness of current development practices in reducing or eliminating long-term environmental impacts • identify, describe, and assess environmental quality monitoring and reporting procedures.
Social and Economic Significance	• describe social and economic significance of energy and mineral development; e.g.: – Keephills – Oldman River Dam – oil sands development • describe government policies and regulations that respond to social and economic concerns related to energy and mineral development • identify public consultation procedures and trade-offs that respond to social, economic and environmental concerns related to energy and mineral development.

MODULE ENM301: THE ENERGY-ENVIRONMENT CONNECTION (continued)

Concept	Performance Indicator
Personal Action Strategy	*The student will:* • conduct a personal environmental audit; e.g.: – consumer – energy – waste • assess personal impact on the environment • develop and implement a strategy to reduce personal impact on the environment • assess the social and economic consequences of implementing the strategy • revise the strategy according to environmental, social and economic outcomes.
Community Action Campaign	• identify and assess opportunities for reducing environmental impacts by the community • identify roadblocks to community action to reduce environmental impacts • develop a communications plan to promote environmental awareness and community energy conservation actions.

MODULE ENM302: ALTERNATIVE FUELS

Level: **Advanced**

Theme: **Technology and Applications**

Prerequisite: **Renewable Technologies (ENM202)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • conduct research on the use of nuclear energy.	*The student will:* •	
• conduct research on the use of hydrogen fuel.	•	
• conduct research on the use of fuel cells.	•	
• conduct research on the use of solar and wind energy .	•	
• conduct research on the use of small hydro production.	•	

MODULE ENM302: ALTERNATIVE FUELS (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Nuclear Energy	*The student will:* • differentiate between fission and fusion reactions in the production of nuclear energy • classify nuclear energy as a renewable or non-renewable source of energy • research the use of nuclear energy in Canada and, where applicable, use Alberta examples: – technology and methods for production – advantages and disadvantages as an alternate source of energy – compare and contrast with traditional sources of energy – potential for the future • describe where and how nuclear energy is currently being used.
Hydrogen Fuel	• classify hydrogen fuel as a renewable or non-renewable source of energy • research the use of hydrogen fuel in Canada and, where applicable, use Alberta examples: – technology and methods for production – advantages and disadvantages as an alternate source of energy – compare and contrast with traditional sources of energy – potential for the future • describe where and how hydrogen fuel is currently being used.
Fuel Cells	• classify fuel cells as a renewable or non-renewable source of energy • research the use of fuel cells in Canada and, where applicable, use Alberta examples: – technology and methods for production – advantages and disadvantages as an alternate source of energy – compare and contrast with traditional sources of energy – potential for the future • describe where and how fuel cells are currently being used.

MODULE ENM302: ALTERNATIVE FUELS (continued)

Concept	Specific Learner Expectations
Solar and Wind Energy	*The student will:* • research the use of solar and wind energy in Canada and, where applicable, use Alberta examples: – technology and methods for production – advantages and disadvantages as an alternate source of energy – compare and contrast with traditional sources of energy – potential for the future • describe where and how solar and wind energy is currently being used.
Small Hydro Production	• classify small hydro production as a renewable or non-renewable source of energy • research the use of small hydro production in Canada and, where applicable, use Alberta examples: – technology and methods for production – advantages and disadvantages as an alternate source of energy – compare and contrast with traditional sources of energy – potential for the future • describe where and how small hydro production is currently being used.

MODULE ENM303: MARKETING TRENDS AND ISSUES

Level: **Advanced**

Theme: **Technology and Applications**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • investigate market demands for energy and minerals	*The student will:* •	30
• identify major export partners for energy and minerals	•	40
• consider the impact of government policies on the development and marketing of energy and minerals.	•	30

MODULE ENM303: MARKETING TRENDS AND ISSUES (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Market Demands	*The student will:* • identify social, political, and economic factors that affect market demands for energy and minerals; e.g.: – political unrest in the Middle East – invasion of Kuwait • research and prepare a ten-year case history on market demands for one energy or mineral source.
Export Partners for Energy and Minerals	• assess the importance of energy and mineral export to the Province of Alberta and the Government of Canada • identify major export partners for oil, oil products and natural gas • identify major export partners for coal and coal-generated energy • identify major export partners for mineral resources.
Impact of Government Policies	• identify major federal and provincial government policies that influence the development and marketing of energy and minerals • choose one policy as a case study and assess its impact on the development and marketing of energy and minerals in Canada; e.g.: – National Energy Policy – Western Economic Diversification – Oil and Gas Royalty Reduction (Alberta) • assess the impact of national and provincial environmental protection policies on the development and export marketing of energy and minerals, i.e., production cost increases, foreign demands for environmentally sensitive development of Canada's export products

MODULE ENM303: MARKETING TRENDS AND ISSUES (continued)

Concept	Specific Learner Expectations
Impact of Government Policies (continued)	*The student will:* • identify existing and developing trade agreements between provinces and bilaterally and trilaterally with the U.S. and Mexico; e.g.: – provincially: Western Accord, Atlantic Accord – internationally: North American Free Trade Agreement (NAFTA), between trading blocks (European Economic Community, South East Asian Trade Organization) • describe potential opportunities and obstacles to the development and marketing of energy and minerals through participation in these trade agreements.

MODULE ENM304: LOW ENERGY DESIGN AND SYSTEMS II

Level: **Advanced**

Theme: **Management and Conservation**

Prerequisite: **Low Energy Designs and Systems I (ENM204)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • analyze energy use in transportation systems.	*The student will:* •	20
• relate the principles of energy efficiency and conservation to personal transportation systems.	•	40
• investigate developing technologies and systems that support the design of energy efficient vehicles.	•	40

MODULE ENM304: LOW ENERGY DESIGN AND SYSTEMS II (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Energy Use in Transportation	*The student will:* • identify and describe transportation systems • identify and describe energy sources for transportation systems • analyze energy use in transportation systems, considering: – energy efficiency (persons per km per energy unit, mass per km per energy unit transported) – environmental effect (land use, air emissions, environmental cost to development) – economic efficiency (cost per unit per km for energy source) – social effect (health, convenience, aesthetics).
Energy Efficiency and Conservation	• define energy efficiency and conservation • compare and contrast the principles of energy efficiency and conservation • illustrate, by example, the application of energy efficiency and conservation • compare the efficiency of different transportation conveyances based on person per km per energy unit • plan a year-round energy efficient transportation system for self, considering school, work, social, and recreational activities • compare and contrast this plan with current transportation system for self.
Energy Efficient Vehicles	• investigate developing technologies and systems that support the design of energy efficient automobiles; e.g.: – engine design – reduction of vehicle weight – fuel system – fuel type – body design.

MODULE ENM305: ALTERNATIVE ENERGY PATHS

Level: **Advanced**

Theme: **Management and Conservation**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • describe and assess the potential for soft energy path development.	*The student will:* •	40
• describe and assess the potential for sustainable energy development.	•	30
• describe and assess the potential for demand-side management.	•	30

MODULE ENM305: ALTERNATIVE ENERGY PATHS (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Soft Energy Path Development	*The student will:* • compare and contrast current energy planning and development with soft energy path development • describe changes required in our current system to incorporate soft energy path development • assess opportunities for soft energy path planning and development; e.g.: – conventional energy resource inventories – alternative energy technology development – economic, environmental and social consequences.
Sustainable Energy Development	• describe sustainable energy development from an environment– economy perspective • describe changes required in our current system to incorporate sustainable energy development • assess opportunities for sustainable energy development; e.g.: – conventional energy resource inventories – alternative energy technology development – economic, environmental, and social consequences.
Demand-Side Management	• compare and contrast demand-side and supply-side management • consider the benefits of demand-side management in planning for future energy development and use; e.g.: – energy efficiency and conservation – environmental quality – conventional and alternative energy sources – energy costs • consider ways in which personal energy use can support and/or adapt to: – soft energy development – sustainable energy development – demand-side management.

MODULE FOR101: WHY FORESTRY?

Level: **Introductory**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • develop an appreciation of the social, cultural, economic and environmental significance of forests.	*The student will:* •	40
• assess the impact of individual needs, wants and beliefs on the forest resource.	•	30
• investigate potential career paths in forestry.	•	30

MODULE FOR101: WHY FORESTRY? (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Forest Role	*The student will:* • present a historical perspective on the social and cultural significance of forests; e.g.; – recreational – spiritual/aesthetic – medicinal – community dependence • describe the economic significance of forests at local, national and global levels; e.g.: – direct and indirect employment – forest products and export values – tourism – subsistence – tax base • describe the environmental significance of forests at local, national and global levels; e.g.: – wildlife and fisheries habitat – watershed protection and maintenance – water, air and soil quality – maintenance of ecosystems – climate change.
Personal Impact	• assess the impact of individual attitudes, actions and lifestyle on the forest resource; e.g.: – conservation ethic – preservation ethic – consumer practices – recreational patterns • describe how consumer and marketing trends in society may affect the forest resource; e.g.: – needs versus wants – mass media hype – use of environmental friendly products • propose personal strategies for using forests wisely that foster the attainment of social, cultural, economic and environmental goals; e.g.: – personal actions – leadership roles.

MODULE FOR101: WHY FORESTRY? (continued)

Concept	Specific Learner Expectations
Career Paths	*The student will:* • examine career clusters and the range of occupational opportunities within the forestry sector; e.g.: – forest resource inventory – forest biology/ecology – forest resource protection – forest products industry – forest resource management – forest recreation – forest education • gather employment statistics within one or more career clusters; e.g.: – types of careers – number of workers – employment trends • infer career opportunities and trends from employment statistics • infer impacts of the marketplace on employment opportunities • gather information regarding forest industries in the future, and resulting career opportunities • research one or more career paths in forestry; e.g.: – job description/working conditions – entry requirements/competencies – educational/training opportunities – opportunity for advancement – opportunity for self-employment and entrepreneurship.

MODULE FOR102: WOODSMANSHIP

Level: **Introductory**

Theme: **Social and Cultural Perspectives**

Prerequisite: **Basic First Aid, Why Forestry? (FOR101)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • develop knowledge, skills and attitudes that are necessary for safe and comfortable outdoor experiences in the forest.	*The student will:* •	20
• display confidence in participating in a range of outdoor forest activities that have minimal impact on the forest resource.	•	80

MODULE FOR102: WOODSMANSHIP (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Wilderness Survival	*The student will:* • identify, assess, avoid and/or respond to physical hazards that may be imposed by the forest environment; e.g.: – particular terrain and conditions, including avalanche, lake and river ice, and bush travel – wildlife that may be encountered, including bears, bees, ticks, non-edible plants – changes in weather conditions that may affect personal and group safety • identify, assess, avoid and/or respond to physiological and psychological factors often associated with outdoor experiences in the forest; e.g.: – dealing with hypothermia, frostbite and dehydration – understanding fatigue and when not to move – coping with adversities, like getting lost or hurt • list and explain necessary steps to take in emergency and survival situations in the forest; e.g.: – what to do if lost or separated from the group – first aid and emergency response to injury – construction of emergency shelters – how to gather food from edible plants – en route organizational strategies, including lead and sweep, regrouping procedures, pacing • select appropriate personal and group gear for outdoor forest activities; e.g.: – personal gear, with consideration to maintaining body temperature and protection from injury – group gear, to meet requirements for food, shelter, travel and emergencies • demonstrate safe use and appropriate care of outdoor hand tools, including knives, axes and saws • demonstrate safe procedures for building and using outdoor fires; e.g.: – signalling – warming – cooking • explain techniques used to plan, pack, carry and prepare foods during outdoor forest expeditions; e.g.: – nutritional requirements – portability and preservation factors – food preparation techniques – safe use of campfires

MODULE FOR102: WOODSMANSHIP (continued)

Concept	Specific Learner Expectations
Wilderness Survival (continued)	*The student will:* • explain techniques required for maintaining hygiene during outdoor forest expeditions; e.g.: – water purification – personal cleanliness – group hygiene.
Woodstravel	• plan and conduct safe outdoor expeditions in the forest; e.g.: – research information from a variety of sources, including maps, aerial photographs, guidebooks, journals and local experts – interpret route information by selecting reasonable destinations, estimating travel time and anticipating obstacles – apply knowledge and skills while en route, including map reading and compass skills, knowledge of terrain and route selection, and mapping of key landmarks and directions • use different modes of woodstravel to confidently participate in a variety of forest activities; e.g.: – snowshoes, skis, walking staff and canoe – hiking, backpacking, cross-country skiing, canoeing and bird-watching • acquire and apply minimal impact skills while participating in outdoor forest expeditions; e.g.: – proper trial use, including the avoidance of trail widening – campsite care, including the use of fires and stoves, tent site selection, and firewood selection – waste disposal techniques, including latrines, waste water disposal and garbage.

MODULE FOR103: FOREST REGIONS OF CANADA

Level: **Introductory**

Theme: **Social and Cultural Perspectives**

Prerequisite: **Knowledge of geographic regions of Canada**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • examine factors that determine the type and distribution of forests.	*The student will:* •	20
• locate and describe the forest regions of Canada.	•	30
• identify and describe trees that grow in specific regions of Canada and Alberta.	•	50

MODULE FOR103: FOREST REGIONS OF CANADA (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Determining Factors	*The student will:* • identify factors that enhance the development of forests and determine the distribution of living organisms within forest regions; e.g.: – land form – climate • describe relationships between climatic factors and the growth of trees; e.g.: – temperature – moisture • describe relationships between land form and the distribution of forests; e.g.: – topography – soil conditions • suggest reasons for the distribution of trees in natural regions in Canada and Alberta.
Forest Regions	• locate and describe the eight forest regions of Canada; e.g.: – Boreal – Subalpine – Montane – Coast – Columbia – Deciduous – Great Lakes/St. Lawrence – Acadian • read, interpret and create visual representations of species distribution in Canada and Alberta.
Tree Identification	• identify common trees and other plants that grow in specific regions of Canada and Alberta; e.g.: – tree and shrub identification – non-woody plant identification • prepare a display of details that help to identify local trees, shrubs and non-woody plants; e.g.: – leaves – flowers/cones – twigs – bark.

MODULE FOR104: MAPPING AND AERIAL PHOTOGRAPHY

Level: **Introductory**

Theme: **Technology and Applications**

Prerequisite: **Mathematics 7**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • develop an awareness of different types of maps and the information conveyed through maps.	*The student will:* •	30
• interpret and apply information conveyed through different types of maps.	•	70

MODULE FOR105: MEASURING THE FOREST I

Level: **Introductory**

Theme: **Technology and Applications**

Prerequisite: **Mapping and Aerial Photography (FOR104)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • outline basic goals and techniques of conducting a forest survey.	*The student will:* •	20
• gather and interpret a variety of maps used in forest surveys.	•	30
• develop and apply basic skills used in measuring direction and distance in the forest.	•	50

MODULE FOR106: BASIC FOREST ECOLOGY

Level: **Introductory**

Content Focus: **Management and Conservation**

Prerequisite: **Science 7**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • develop an awareness of the complexity and interrelatedness of elements in the forest ecosystem.	*The student will:* •	50
• examine the process of change in a forest environment.	•	50

MODULE FOR106: BASIC FOREST ECOLOGY (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Forest Ecosystems	*The student will:* • identify living and non-living elements within a local forest ecosystem; e.g.: – soil characteristics – land form – climate – flora and fauna – soil organisms • examine the interrelatedness of elements within a local forest environment; e.g.: – relationship of soil, air and water characteristics to plant growth – interactions and dependencies among living organisms • explain the role of trees within a local forest ecosystem; e.g.: – exchange of gases – water cycle – nutrient cycling – wildlife habitat – soil conservation • analyze food relationships among living organisms within a local forest environment; e.g.: – role of producers, consumers and decomposers – food chains and webs • compare the ecological niches of selected plant and animal species native to Alberta.
Forest Change	• identify living and non-living agents of change in a local forest environment • infer structural and/or behavioural adaptations of living organisms to particular changes in the forest environment; e.g.: – adaptations to site conditions – reproductive adaptations • consider the impacts of specific environmental changes on a forest community; e.g.: – short-term consequences – long-term consequences • give examples of primary and secondary successional stages in a local forest environment • describe Alberta's natural forest history; e.g.: – role of fire – role of other agents.

MODULE FOR107: FORESTS FOREVER I

Level: **Introductory**

Theme: **Management and Conservation**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • survey historical trends in the use of Canada's forests.	*The student will:* •	20
• develop an understanding of how increased demands placed on the forest resource have created a need for conservation and management of forested regions.	•	50
• examine the role of technology and research in forest protection.	•	30

MODULE FOR107: FORESTS FOREVER I (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Forest History	*The student will:* • outline changing patterns of forest use in Canada and Alberta from past to present • trace the history of forest land tenure in Canada and Alberta • infer the impact of historical trends in forest use and ownership on people, the economy and the environment • make predictions about the use of Canada's forest resources in the future.
Conservation and Management	• compare and contrast different uses of forested regions in terms of their advantages and disadvantages; e.g.: – environmental – economic – social • investigate the roles of different interest groups in managing the forest resource; e.g.: – government – forest industry – general public – other stakeholder groups • relate concepts of sustainable development and sustained yield to practical strategies for managing the forest resource; e.g.: – reforestation – stand improvement • debate an issue regarding sustainable development and/or sustained yield; e.g.: – conduct research – develop a position – participate in debate • examine demands that are placed on forested regions of Canada and Alberta; e.g.: – industry – recreation – wildlife – environment • develop consensus regarding a plan for the integrated use of a local forested area; e.g.: – conduct research – generate alternatives – agree to a workable solution.

MODULE FOR107: FORESTS FOREVER I (continued)

Concept	Specific Learner Expectations
Forest Protection	*The student will:* • provide justification for protecting the forest resource; e.g.: – material and non-material benefits – environmental impact • identify and describe major components of forest protection; e.g.: – forest fire management – soil conservation and land reclamation – pest and disease control • explain basic goals and techniques of forest fire management, soil conservation and land reclamation • identify and describe symptoms of common forest pests and diseases • compare different methods of pest and disease control; e.g.: – biological methods – forest management – chemical methods.

MODULE FOR201: RULES OF THE GAME

Level: **Intermediate**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will:	*The student will:*	
• demonstrate an understanding of the administration of Alberta's forested lands.	•	20
• examine government legislation and policies affecting the forest resource.	•	40
• investigate different types of land and timber dispositions used in forest management.	•	40

MODULE FOR201: RULES OF THE GAME (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Administration of Forested Lands	*The student will:* • outline major changes that have occurred from past to present in the ownership and administration of forested lands in Alberta; e.g.: – Federal jurisdiction – Provincial status – Natural Resource Transfer Act • examine different land tenures in Alberta today; e.g.: – public (provincial and federal crown lands) – private • identify, locate and compare different land management areas in Alberta; e.g.: – white area – green area • describe the mandates of agencies responsible for managing forested lands within Alberta's boundaries, and the proportion of land under their jurisdiction; e.g.: – Alberta Environmental Protection (Land and Forest Services, Parks Services, Fish and Wildlife Services) – National Parks – Private Ownership – Metis or Native Indian – Forestry Canada.
Government Legislation and Policies	• explain how activities in Alberta's forests are subject to a variety of government Acts and regulations • discuss the intent of important government Acts in managing the forest; e.g.: – Forests Act – Forest Reserves Act – Forest and Prairie Protection Act – Provincial Parks Act – Wilderness Areas, Ecological Reserves and Natural Areas Act • examine the role of regulations and guidelines established in association with government Acts in further managing the forest; e.g.: – Timber Management Regulations (Timber Operating Groundrules, Reforestation Standards) – Forest and Prairie Protection Regulations (Part I and II) – Forest Land Use Regulations (Recreation, Mineral, Pipeline, Grazing) • consider the short term and long term effects of selected government Acts and regulations on forested land.

MODULE FOR201: RULES OF THE GAME (continued)

Concept	Specific Learner Expectations
Forest Land and Timber Dispositions	*The student will:* • explain the use of dispositions (i.e., authorizations in the form of permits, licences or other legal agreements) in managing commercial activities on forested lands • examine criteria used to establish forest land and timber dispositions and reservations; e.g.: – fibre production – recreation – agriculture – wildlife habitat – integrated use • discuss the intent of different timber dispositions issued by the Alberta Forest Service, and the responsibilities of holders of these dispositions; e.g.: – Forest Management Agreements (FMAs) – Quota Certificates – Timber Licences – Commercial Timber Permits – Local Timber Permits • describe other types of dispositions that are used to manage activities on forested lands; e.g.: – grazing leases, permits and licences – hunting, fishing and trapping permits and licences – surface mineral leases – commercial trail riding permits • conduct research on the role of consultation (with other resource users) and public involvement in establishing land and timber dispositions.

MODULE FOR202: MAKING A DIFFERENCE TO FORESTRY

Level: **Intermediate**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • assess personal attitudes, actions and lifestyle in terms of impact on the forest resource.	*The student will:* •	20
• examine strategies for reducing, reusing and recycling.	•	20
• demonstrate commitment to environmental stewardship through personal and shared actions.	•	60

MODULE FOR202: MAKING A DIFFERENCE TO FORESTRY (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Attitudes, Actions and Lifestyle	*The student will:* • consider how societal attitudes, actions and lifestyle may affect the forest resource; e.g.: – conservation ethic – consumer practices – recreational patterns • describe factors that influence consumer and marketing trends, and how these trends may affect the forest resources; e.g.: – social – economic – environmental • compile a personal inventory of possessions and material purchases made over the last year • differentiate between personal needs and wants, as reflected through personal inventory • assess the advantages and disadvantages of personal actions and lifestyle in terms of impact on the forest resource.
Reduce, Reuse and Recycle	• outline societal trends in reducing our consumption of material goods • examine historical aspects of reusing products and materials, and identify common refuse that can be reused in practical and economical ways • conduct research on materials that are being recycled and the products that are produced • analyze trade-offs that occur through reducing, reusing and recycling; e.g.: – economic – environmental.
Environmental Stewardship	• propose personal strategies for using the forest resource that foster the attainment of social, cultural, economic and environmental goals; e.g.: – personal actions – leadership roles • plan, conduct and assess a school-wide campaign to increase awareness of lifestyle, conservation and the environment; e.g.: – establish goals – plan and conduct – assess results

MODULE FOR202: MAKING A DIFFERENCE TO FORESTRY (continued)

Concept	Specific Learner Expectations
Environmental Stewardship (continued)	*The student will:* • debate an issue regarding the impacts of lifestyle on the forest resource; e.g.: – conduct research – develop a position – participate in debate • identify constructive ways in which individuals can influence public decisions that affect the forest and all its resources; e.g.: – voting – lobbying – seeking office – supporting compatible interest groups • assess the goals and objectives of one or more conservation groups.

MODULE FOR205: MEASURING THE FOREST II

Level: **Intermediate**

Theme: **Technology and Applications**

Prerequisite: **Measuring the Forest I (FOR105)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • develop and apply strategies for sampling a forested area.	*The student will:* •	40
• develop and apply strategies for assessing the fibre and non-fibre value of forests.	•	40
• explain applications of timbre cruise data in compiling information about a forested area.	•	20

MODULE FOR206: LOGGING AND FOREST PRODUCTS

Level: **Intermediate**

Theme: **Technology and Applications**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • identify steps involved in developing a plan for forest harvest.	*The student will:* •	10
• describe the mechanics of harvesting trees.	•	50
• research techniques used in fibre utilization and product formation.	•	40

MODULE FOR207: FORESTS FOREVER II

Level: **Intermediate**

Theme: **Management and Conservation**

Prerequisite: **Forests Forever I (FOR107)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • explain the goals of forest management in Alberta.	*The student will:* •	40
• consider different areas of forest use, and the views of different users.	•	20
• describe current practices used to manage Alberta's forested lands.	•	40

MODULE FOR207: FORESTS FOREVER II (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Forest Management Goals	*The student will:* • explain the goals of sustainable development within the context of Alberta's forests • relate the concept of sustained yield to a system of harvesting and reforestation • explain applications of "annual allowable cut" in forest management practices • identify scientific, economic and social factors addressed through the management of forested lands in Alberta; e.g.: – the silvics of trees growing in the area – a cycle for utilization and replacement – the goals of different stakeholder groups.
Forest Uses and Users	• compare and contrast current uses and values of Alberta's forests; e.g.: – recreation and aesthetics – wildlife habitat – fibre production – range lands – coal and petroleum projects – hunting and trapping – water, air and soil quality – ecosystem maintenance – job creation • consider the views of different forest stakeholder groups and potential conflicts that may arise; e.g.: – recreational – environmental – industrial • explain the need for consultation with other resource users and public involvement in forest management.

MODULE FOR207: FORESTS FOREVER II (continued)

Concept	Specific Learner Expectations
Forest Management Practices	*The student will:* • identify components of conservation and utilization in current forest management practices • describe the mandates of agencies responsible for managing Alberta's forested lands; e.g.: – Alberta Forest Service – Fish and Wildlife – Public Lands – Forest Industry Development – Land Information Services • describe current management practices that make Alberta's productive forests available to industry for commercial harvest; e.g.: – forest management agreements – quota certificates – commercial timber permits – local timber permits • consider factors likely to influence future forest management practices; e.g.: – new knowledge and technology – increased public participation.

MODULE FOR210: USERS IN THE FOREST

Level: **Intermediate**

Theme: **Management and Conservation**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • explore a variety of uses of the forest, and the need to consider the interests of all forest users.	*The student will:* •	30
• demonstrate an understanding of the principles of integrated land use.	•	30
• research the development of a plan for integrated resource management.	•	40

MODULE FOR210: USERS IN THE FOREST (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Forest Uses	*The student will:* • identify and describe major types of forest use; e.g.: – industrial – recreational – wildlife habitat – water, air and soil quality • conduct research regarding specific uses and multiple demands placed upon forested land; e.g.: – wood fibre production – wildlife management – grazing and range management – watershed – oil, gas and mining – recreation – protected areas • explain that forests can and should serve many purposes • cite examples of the multiple use of Alberta's forests; e.g.: – using different parts of the forest for different purposes – using the same area of the forest to obtain more than one benefit.
Integrated Land Use	• explain that integrated land use principles involve using a common area of forested land for two or more purposes; e.g.: – wood fibre – range – wildlife – recreation – mining • cite examples of the integrated use of local forested lands • compare and contrast principles of integrated land use with principles of multiple use management • develop consensus regarding a plan for the integrated use of a local forested area; e.g.: – conduct research – generate alternatives – agree to a workable solution.

MODULE FOR210: USERS IN THE FOREST (continued)

Concept	Specific Learner Expectations
Integrated Resource Management	*The student will:* • discuss the history and function of Integrated Resource Planning (IRP) in establishing policy and guidelines for managing forested land • identify and describe the basic components of Integrated Resource Planning; e.g.; – establishing a planning team – setting goals and objectives – soliciting public involvement – obtaining approval for the plan • prepare a flow chart that outlines relationships among the components of Integrated Resource Planning • research two or more forest management plans having different goals, identifying components of Integrated Resource Planning that are present in each; e.g.: – forest protection – access management – harvest planning – range management – wildlife management.

MODULE FOR301: ISSUES IN FORESTRY

Level: **Advanced**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • acquire an understanding that current issues in forest management are complex and involve alternatives and consequences.	*The student will:* •	20
• consider how many problems, issues and trends involving Canada's forests are similar to those in other parts of the world.	•	30
• demonstrate personal and shared actions that foster the conservation and management of forested regions.	•	50

MODULE FOR301: ISSUES IN FORESTRY (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Issues Involve Alternatives	*The student will:* • outline historical trends in the consumptive and non-consumptive use of forests • analyze differing points of view regarding how and to what degree Canada's forests should be used • examine positive and negative effects of forest industry development on people, industry and the environment • consider the advantages and disadvantages of different forest harvesting practices; e.g.: – clearcutting – selective harvesting • research issues related to the expansion and management of Alberta's forest industry; e.g.: – access management – herbicide use in timber management – old growth management – maintenance of biodiversity • describe ways in which different forest stakeholders make use of the judicial, legislative and regulatory systems in working toward their objectives.
Global Issues and Trends	• compare and contrast issues involving Canada's forests with similar issues in other parts of the world; e.g.: – land use – expansion of the forest industry – forest renewal processes – management of old growth forests – climate change and forest ecosystems – extensive versus intensive management • consider global impacts of the recreational and commercial use of forests; e.g.: – social and cultural – economic – environmental • infer the long-range effects of the sustainable use of forests in Canada and other parts of the world.

MODULE FOR301: ISSUES IN FORESTRY (continued)

Concept	Specific Learner Expectations
Personal and Shared Actions	*The student will:* • compare and contrast different philosophies, ethics and alternatives regarding the forest resource and how best to ensure its health and sustainability • assess the goals and objectives of one or more forest conservation or preservation groups • debate a global issue regarding the consumptive and/or non-consumptive use of forests; e.g.: – conduct research – develop a position – participate in debate • develop consensus regarding a plan for the use of a forested region; e.g.: – conduct research – generate alternatives – agree to a plan that meets an acceptable level of needs • initiate responsible and ethical actions in relation to the forest and its many resources; e.g.: – personal actions – leadership roles.

MODULE FOR305: MEASURING THE FOREST III

Level: **Advanced**

Theme: **Technology and Applications**

Prerequisite: **Measuring the Forest II (FOR205)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • explain applications of remote sensing in current forestry practices.	*The student will:* •	60
• explain applications of computer systems in current forestry practices.	•	30
• outline contributions of research and technology in measuring the forest resource.	•	10

MODULE FOR306: THE FOREST MARKETPLACE

Level: **Advanced**

Theme: **Technology and Applications**

Prerequisite: **Logging and Forest Products (FOR206)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • recognize the range of consumer products and services derived from Canada's forest resource.	*The student will:* •	20
• investigate the processing of fibre and non-fibre forest products in Canada and Alberta.	•	20
• explore market trends and marketing systems for forest products.	•	60

MODULE FOR306: THE FOREST MARKETPLACE (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Products and Services	*The student will:* • identify market-based products and services derived from Alberta's forests; e.g.: – primary wood products – wood-fabricated materials – wood pulp and paper products – chemical products – trapping, fishing and hunting – guiding and outfitting – tourism and recreational pursuits • identify psychological benefits and extra-market values derived from Alberta's forests; e.g.: – ecological values – aesthetic and spiritual values – bequest value for future generations • consider trends in the consumptive and non-consumptive use of forests in Canada and Alberta; e.g.: – increase in recreation – decrease in trapping – increase in logging – decrease in oil and gas development.
Processing	• provide a historical perspective on technologies used in processing Alberta's fibre products • classify and sequence the steps that are involved in producing a fibre commodity; e.g.: – harvest and transportation – processing techniques – grading, packing and storage • identify materials and services that are required at each stage in the production of a fibre commodity; e.g.: – human and natural resources – energy and technologies – inspection and regulation • assess the impact of consumer trends and developing technologies on Canada's fibre and non-fibre forest products; e.g.: – product/service specialization – efficiency of production processes – focus on value-added and knowledge intensive commodities

MODULE FOR306: THE FOREST MARKETPLACE (continued)

Concept	Specific Learner Expectations
Processing (continued)	*The student will:* • identify new and emerging products and services derived from Alberta's forests; e.g.: – cattle food – methane gas – random use of forest amenities.
Marketing Trends and Systems	• consider social, economic and environmental factors that influence consumer trends and markets for forest products and services • identify market opportunities that arise from product diversification and specialization, international trade and participation in a global economy • examine the nature and extent of Canada's market share in North America, the Pacific Rim, Europe and other locations • describe viable strategies and systems used in marketing Canada's forest products and services at local, national and international levels • formulate a plan for identifying market opportunities, developing a forest product, and managing the venture.

MODULE FOR307: RESEARCH, TECHNOLOGY AND CAREER TRENDS

Level: **Advanced**

Theme: **Technology and Application**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • examine different aspects of forest research that are carried out in Canada and Alberta.	*The student will:* •	30
• develop an awareness of past, present and emerging technologies used in the forest industry.	•	20
• consider career requirements, opportunities and trends within the forestry sector.	•	50

MODULE FOR307: RESEARCH, TECHNOLOGY AND CAREER TRENDS (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Research	*The student will:* • identify and describe different aspects of forest research that are carried out in Canada and Alberta; e.g.: – silviculture – harvesting systems – forest products – forest protection – wildlife inventories – ecological studies – integrated resource management • compare the goals and priorities of local agencies whose mandate is to conduct research related to forestry and forest ecosystems; e.g.: – individuals – corporations – colleges and universities – government agencies • explain the role of the Alberta Forest Research Advisory Council in coordinating forest research activities in Alberta • examine potential applications of data banks and information systems in making forest management decisions • investigate the development of a research plan for the enhanced utilization and/or management of forests; e.g.: – define goals and objectives of the plan – consider economic, political, scientific and related factors – outline methodologies and strategies – state outcomes and types/kinds of data obtained – discuss limitations of the plan, or information that may be lacking or incomplete.
Technologies	• present a historical perspective on applications of technology in the forest industry; e.g.: – greenhouse and nursery operations – silviculture – harvesting technologies – wood production and utilization – biotechnology • describe potential applications of new technologies in the forest industry; e.g.: – pulping procedures – effluent treatment and pollution control

MODULE FOR307: RESEARCH, TECHNOLOGY AND CAREER TRENDS (continued)

Concept	Specific Learner Expectations
Technologies (continued)	*The student will:* • assess the advantages and disadvantages of a recent technology designed to enhance our utilization and/or management of forests; e.g.: – social – economic – environmental.
Career Trends	• suggest ways in which research, technology, social values and land use priorities may impact forest industries in the future • predict future career clusters and occupational opportunities within the forestry sector, and the education/training that may be required to gain employment and advance in related fields • examine career clusters and the range of occupational opportunities available within the forestry sector; e.g.: – forest inventory – forest biology/ecology – forest protection – forest harvest – forest products industry – forest management • research one or more career paths in forestry; e.g.: – job description/working conditions – entry requirements/competencies – educational/training opportunities – opportunity for advancement – opportunity for self-employment and entrepreneurship.

MODULE FOR308: ADVANCED FOREST ECOLOGY

Level: **Advanced**

Theme: **Management and Conservation**

Prerequisite: **Biology 20**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • describe structural units of the tree and their function in performing life processes.	*The student will:* •	30
• examine the effects of soil, air and water characteristics on forest ecosystems.	•	40
• investigate factors that determine the ability of tree species and forest ecosystems to occur in particular environments.	•	30

MODULE FOR308: ADVANCED FOREST ECOLOGY (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Tree Biology	*The student will:* • explain the vital life processes performed by trees and other forest plants; e.g.: – nutrient intake and transportation – photosynthesis – respiration and transpiration – reproduction – phenology (leaf flushings, leaf fall, flowering and cone production) • describe structural units and component parts of the tree, and their function in performing vital life processes; e.g.: – root – trunk/stem – leaf – flower • infer interrelationships among tree structures, their functions, and vital life processes that are performed • display the approximate range of one or more tree species throughout North America.
Forest Ecosystems	• describe physical characteristics used to classify forest soils, and the effect of different soils on plant growth; e.g.: – texture – porosity • explain the function of organic and inorganic components of forest soils; e.g.: – micro and macro organisms – gases and minerals – organic matter – water • examine the effects of soil acidity, alkalinity and temperature on the growth of trees and other forest plants • describe indicators of water quantity and quality in the forest, and their effects on trees and other plants; e.g.: – surface water and ground water – protozoans, phytoplankton and zooplankton – gases, salts and other substances • describe the effects of known air pollutants on forest ecosystems; e.g.: – ozone – particulate matter – oxides and nitrogen – sulphur dioxide

MODULE FOR308: ADVANCED FOREST ECOLOGY (continued)

Concept	Specific Learner Expectations
Forest Ecosystems (continued)	*The student will:* • describe the effects of a forest on the local environment; e.g.: – soil and water – weather – other wildlife • infer the effects of forests worldwide on global climates.
Forest Associations	• explain that each tree species has unique site and climatic requirements that determine its ability to grow in particular environments • examine the general characteristics, life history, site and climatic requirements of several Alberta tree species; e.g.: – tree form – growth patterns and life cycle – soil – moisture – aspect and elevation • describe the general structural characteristics and environments of some common forest associations in Alberta; e.g.: – soil – moisture – position on slope.

MODULE FOR309: SILVICULTURE: GROWING THE FOREST

Level: **Advanced**

Theme: **Management and Conservation**

Prerequisite: **Advanced Forest Ecology (FOR308)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • develop an understanding of silviculture and the silvics of Alberta tree species.	*The student will:* •	25
• examine practices used to establish a stand of trees and manipulate growing conditions to favour particular species.	•	50
• explore growth/harvest relationships, and appropriate methods of harvesting tree species.	•	25

MODULE FOR309: SILVICULTURE: GROWING THE FOREST (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Silviculture and Silvics	*The student will:* • define silviculture as the science and art of growing and tending forest crops to obtain more and better benefits from forests including wood • identify major components of silvicultural systems; e.g.: – stand establishment – stand management – harvest and re-establishment • explain that individual tree species have unique ecological requirements that determine suitable silvicultural practices • compare and contrast the ecological requirements and silvics for two or more Alberta tree species • outline one or more research programs designed to improve silvicultural practices; e.g.: – genetic selection – geographic information systems – harvesting operations.
Regeneration and Stand Treatment	• give examples of regeneration where seedlings are established by natural methods; e.g.: – naturally-supplied seeds – vegetative reproduction • give examples of regeneration where seedlings are established by artificial methods; e.g.: – planting bare-root and container seedlings – broadcasting seeds • compare the advantages and disadvantages of natural and artificial methods of regeneration • describe techniques for site preparation and the care and planting of seeds and seedlings • provide a historical perspective on artificial regeneration (i.e., reforestation) practices in Alberta • compare intermediate stand tending with agricultural or gardening procedures; e.g.: – cleaning – thinning – pruning – fertilizing – protecting • distinguish between intensive and extensive stand management practices.

MODULE FOR309: SILVICULTURE: GROWING THE FOREST (continued)

Concept	Specific Learner Expectations
Cutting Methods	*The student will:* • discuss factors to consider in choosing a suitable method of harvest; e.g.: – growth characteristics – intended utilization – regeneration of species • outline historical and current applications of the principle methods of harvesting trees; e.g.: – clearcutting method – seed tree method – shelterwood method – selection method • compare the advantages and disadvantages of the principle methods of harvesting trees • match appropriate harvest methods with individual tree species by applying knowledge of silvics.

MODULE FOR310: STEWARDSHIP: BALANCING NEEDS

Level: **Advanced**

Theme: **Management and Conservation**

Prerequisite: **Users in the Forest (FOR210)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will:	*The student will:*	
• review basic forest management principles.	•	10
• formulate a plan for the sustainable development and integrated use of forested land.	•	90

MODULE FOR310: STEWARDSHIP: BALANCING NEEDS (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Basic Principles	*The student will:* • explain sustainable development and sustained yield within the context of Canada's forests • compare principles of integrated land use with principles of multiple use management by citing examples of each within Alberta • consider local opportunities for consultation and public involvement in forest management decisions.
Planning Process	• establish short- and long-term goals for the management of forested land on an integrated basis; e.g.: – recreation – forage – wildlife habitat – wood fibre – oil and gas • examine scientific, economic and social factors that need to be addressed through the management plan; e.g.: – the objectives of different stakeholders – relevant government Acts and regulations – forest inventory requirements – the silvics of tree species and appropriate harvest methods – consumer trends and markets for forest products – potential applications of research and technology • survey the views of different stakeholders in the forest and resolve conflicts that may arise; e.g.: – recreational – environmental – aboriginal – industrial – agricultural • incorporate consultation with other resource users and public involvement into the planning process • identify alternative means of achieving the management goals, and select the preferred alternatives • elaborate upon permits, licences or other legal agreements that may be required • develop a set of actions and present the management plan; e.g.: – a general description of the forested area – long-term management objectives – short-term management objectives – proposed management standards and guidelines – a schedule of short-term development activities

MODULE FOR310: STEWARDSHIP: BALANCING NEEDS (continued)

Concept	Specific Learner Expectations
Planning Process (continued)	*The student will:* • prepare a map to accompany and elaborate upon the management plan; e.g.: – boundaries of the forested area – forest cover and other resources within the area – physical features – history of past development – road access – proposed development activities • describe techniques for monitoring the management plan to ensure that goals are being achieved.

MODULE WLD101: WHAT IS WILDLIFE?

Level: **Introductory**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will:	*The student will:*	
• develop an awareness of wildlife.	•	30
• examine the complexity and interrelatedness of wildlife and dynamic ecosystems.	•	50
• examine the need to manage and conserve wildlife.	•	20

MODULE WLD101: WHAT IS WILDLIFE? (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Awareness	*The student will:* • write a definition of wildlife based upon personal experience and the results of research • identify similarities and differences among wildlife and humans; e.g.: – basic needs – behavioural characteristics – physical characteristics • give evidence of diversity among Alberta's wildlife species.
Dynamic Ecosystems	• identify living and non-living components of a local ecosystem; e.g.: – soil, water and air characteristics – climate – plant and animal species – lower life forms • examine the interrelatedness of components within a local habitat; e.g.: – interrelationships among food, water, shelter and space – relationship of soil, water and air characteristics to plant and animal health • analyze relationships among wildlife species; e.g.: – role of producers, consumers and decomposers – food webs and energy chains – social organizations and species competition • identify environmental factors that limit the size of wildlife populations; e.g.: – natural versus non-natural mortality – climatic conditions – pollution and accidents – loss of habitat – predation • relate the concept of carrying capacity to the number, health and distribution of wildlife in a local environment • examine factors associated with adaptation and change in species.

MODULE WLD101: WHAT IS WILDLIFE? (continued)

Concept	Specific Learner Expectations
Wildlife Management	*The student will:* • explain how the well-being of both humans and wildlife are dependent upon the quality of the natural environment • examine natural and human-caused changes in habitat, and the effects of these changes on wildlife species • examine the impacts of wildlife on both humans and the environment, and the need to manage and conserve wildlife • become aware of differing opinions regarding the value of wildlife management and conservation.

MODULE WLD103: NATURAL HISTORY OF ALBERTA WILDLIFE

Level: Introductory

Theme: Management and Conservation

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • survey the diversity of wildlife present in Alberta and Canada.	*The student will:* •	25
• investigate the structure, behaviour and habitat of wildlife species present in Alberta.	•	50
• interpret Alberta's wildlife within a global context.	•	25

MODULE WLD103: NATURAL HISTORY OF ALBERTA WILDLIFE (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Diversity of Wildlife	*The student will:* • give evidence that wildlife is present in all areas of Alberta and Canada, and exhibits a variety of forms, structures and behaviours; e.g.: – wildlife in rural and urban areas – wildlife as part of land and water systems • describe major groups of wildlife present in Alberta and Canada; e.g.: – wild plants – invertebrates – microorganisms – fishes, amphibians, reptiles, birds and mammals • identify and compare species within major groups of wildlife present in Alberta and Canada • explain why certain wildlife species may live in some regions of Alberta and Canada, and not in others.
Structure, Behaviour and Habitat	• compare the structure, behaviour and habitat of species that characterize Alberta's wildlife • interpret the interactions of selected wildlife species with other species and with the environment; e.g.: – predator/prey relationships – food chains and food webs • cite instances where the success of wildlife species can be attributed to their ability to adapt to environmental factors • conduct an ecological study on one or more wildlife species present in Alberta; e.g.: – structural and behavioural adaptations – interaction with other species – habitat – lifecycle – social organization.
Global Context	• compare diversity among living organisms in Alberta and other parts of the world • suggest reasons for differences in diversity among living organisms in Alberta and other parts of the world; e.g.: – earth history – extinction – biotic and abiotic factors – human influences.

MODULE WLD104: OUR WILDLIFE—OUR RESPONSIBILITY

Level: **Introductory**

Theme: **Management and Conservation**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • describe the social, cultural, economic and environmental significance of wildlife.	*The student will:* •	40
• consider the impact of personal needs, wants, beliefs and actions on wildlife.	•	40
• investigate potential career paths in wildlife.	•	20

MODULE WLD104: OUR WILDLIFE—OUR RESPONSIBILITY (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Significance of Wildlife	*The student will:* • examine the social and cultural significance of wildlife; e.g.: – recreational – spiritual and aesthetic – medicinal – indigenous peoples • examine the economic significance of wildlife; e.g.: – tourism – subsistence – commercial trade • examine the environmental significance of wildlife; e.g.: – water, air and soil quality – diversity of life forms – maintenance of ecosystems.
Personal Impact	• examine the impact of individual attitudes, actions and lifestyle on wildlife and the environment; e.g.: – recreation and tourism – housing and transportation choices – subsistence and commercial trade – energy use • describe how the growth of human populations affects wildlife through the destruction of habitat; e.g.: – urban sprawl – construction of roads and buildings – extraction or harvesting of natural resources – addition of materials to the environment.
Career Paths	• outline career areas and the range of occupational opportunities within wildlife-related fields; e.g.: – recreation – tourism – resource harvesting – literature, art and/or film – conservation and management – research – education • research one or more career paths in a wildlife-related field; e.g.: – job description/working conditions – entry requirements/competencies – educational/training opportunities.

MODULE WLD202: MEASURING THE VALUE OF WILDLIFE

Level: **Intermediate**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • assess the cultural, social, environmental and economic significance of wildlife.	*The student will:* •	30
• assess the impact of individual needs, wants, beliefs and actions on wildlife and its habitat.	•	30
• research current and future career opportunities in wildlife related fields.	•	40

MODULE WLD202: MEASURING THE VALUE OF WILDLIFE (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Significance of Wildlife	*The student will:* • examine human and wildlife relationships that are expressed through religious teachings, art, music, drama, literature, photography or other means of expression • assess present and future social and health benefits that may be derived from wildlife; e.g.: – recreational – medicinal – spiritual and aesthetic • explain how wildlife may be used as a barometer of overall environmental quality; e.g.: – water, air and soil quality – diversity of life forms • infer relationships among the distribution and abundance of wildlife and the economy of a given area; e.g.: – tourism – commercial trade – industrial products.
Personal Impact	• assess the impact of individual attitudes, actions and lifestyle on wildlife and the environment; e.g.: – pursuit of leisure time and outdoor activities – use of energy and water – housing and transportation choices – subsistence and commercial trade – consumptive/conservation ethic • assess the impact of human population growth on wildlife and its habitat; e.g.: – rural and urban development – transportation corridors – extraction or harvesting of natural resources – addition of materials to the environment – recreation and tourism • propose responsible and ethical lifestyle actions in relation to wildlife and the environment; e.g.: – personal actions – leadership roles.

MODULE WLD202: MEASURING THE VALUE OF WILDLIFE (continued)

Concept	Specific Learner Expectations
Career Paths	*The student will:* • identify employment opportunities related to wildlife in both public and private sectors at local, national and international levels • outline career areas and the range of occupational opportunities within wildlife-related fields; e.g.: – recreation – tourism – resource harvesting – literature, art and/or film – conservation and management – research – education • gather employment statistics within one or more career areas; e.g.: – types of careers – number of workers – employment trends • infer career opportunities and trends from employment statistics • research one or more career paths in a wildlife-related field; e.g.: – job description/working conditions – entry requirements/competencies – educational/training opportunities – wage and security of employment relative to other fields – opportunity for advancement – opportunity for self-employment and entrepreneurship.

MODULE WLD203: WILDLIFE SPACES AND SPECIES

Level: **Intermediate**

Theme: **Technology and Applications**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • investigate representative wildlife spaces and species in Alberta and other parts of the world.	*The student will:* •	20
• research the depletion of wildlife species and the destruction of wildlife habitats.	•	40
• compare local and global strategies for protecting and conserving wildlife and its habitat.	•	40

MODULE WLD203: WILDLIFE SPACES AND SPECIES (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Representative Spaces and Species	*The student will:* • identify representative ecoregions in Alberta and Canada, and indicator species found in these regions • illustrate the interdependence of wildlife species within selected ecoregions of Alberta and Canada; e.g.: – food webs – energy chains • identify factors that determine the carrying capacity for wildlife species within selected ecoregions of Alberta and Canada; e.g.: – food and water – predators – population density – species competition – other environmental factors • compare representative ecoregions in Alberta and Canada with similar ecoregions in other parts of the world; e.g.: – climate – geography – indicator species.
Endangered Spaces and Species	• define and give examples of endangered spaces and species • assess the impact of natural phenomena on the depletion of wildlife species and/or destruction of wildlife habitat; e.g.: – climatic – geological – biological • assess the impact of societal actions on the depletion of wildlife species and/or destruction of wildlife habitat; e.g.: – urbanization – recreational pursuits – transportation and energy choices – food, clothing and shelter needs – career choices • conduct an ecological study on an endangered wildlife space or species.

MODULE WLD203: WILDLIFE SPACES AND SPECIES (continued)

Concept	Specific Learner Expectations
Canada in a Global Context	*The student will:* • compare policies and philosophies regarding wildlife protection and habitat management in Canada with those of other nations and governments • examine the viewpoints of indigenous peoples in Canada and other nations regarding the use of wildlife spaces and species; e.g.: – traditional wilderness use – current use and future directions • explain the role of protected spaces in managing ecosystems at local, national and global levels; e.g.: – parks – wildlife and wilderness areas – migratory bird sanctuaries – ecological reserves – world heritage sites • examine the role of public and private organizations in Canada and other nations with regard to protecting and conserving wildlife; e.g.: – government – industry – environmental and other organizations.

MODULE WLD205: INTERACTIONS OF WILDLIFE AND SOCIETY

Level: **Intermediate**

Theme: **Management and Conservation**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • assess the impact of human population growth on wildlife.	*The student will:* •	20
• assess the impact of land use practices on wildlife.	•	40
• examine strategies used to manage interactions between wildlife and society.	•	40

MODULE WLD205: INTERACTIONS OF WILDLIFE AND SOCIETY (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Human Population Growth	*The student will:* • describe how the use of wildlife affects the development, movement and size of human societies • examine the impact of human population growth and developing technologies on wildlife and habitat • assess the impact of human population growth on wildlife and habitat in the local area; e.g.: – changes in habitat – distribution, diversity and abundance of species • identify wildlife spaces and species that are threatened, endangered and/or extinct as a result of human population growth.
Land Use Practices	• identify business/industry that interacts with wildlife; e.g.: – agriculture – energy and mining – forestry – tourism – outdoor recreation • evaluate the costs and benefits of interactions between industry and wildlife; e.g.: – habitat loss/food production – species extinction/employment gains • examine the impact of individual and societal land use practices on wildlife; e.g.: – waste production, disposal and pollution – management of wildlife populations – urbanization – habitat protection and improvement.
Managing Interactions	• describe the roles and responsibilities of the different stakeholder groups in managing interactions between wildlife and society; e.g.; – government and non-government organizations – business and industry – land owners – individual citizens • compare the goals and objectives of two or more environmental organizations • assess consequences of an existing management plan for wildlife; e.g.: – environmental – social, cultural and economic.

MODULE WLD206: ISSUES IN WILDLIFE I

Level: **Intermediate**

Theme: **Management and Conservation**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • develop awareness of a range of issues in wildlife.	*The student will:* •	50
• conduct research on one or more wildlife issues in Canada.	•	50

MODULE WLD206: ISSUES IN WILDLIFE I (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Issues in Wildlife	*The student will:* • identify two or more wildlife issues within each of the following categories: – loss and degradation of habitat – subsistence and commercial trade – preservation versus conservation – wildlife economics – wildlife management • infer the impact of each of the issues on wildlife, humans and the environment • examine different philosophies, ethics and alternatives regarding each of the issues.
Wildlife Research	• conduct research on a significant wildlife issue in Canada; e.g.: – identify key elements and stakeholders – distinguish among facts, opinions and beliefs – consider implications and consequences • prepare to defend a position with respect to the issue based on the evidence gathered • consider alternatives to the position taken, and potential strategies for resolving the issue • compare and contrast the wildlife issue with similar issues in other parts of the world • assess the goals and achievements of one or more wildlife conservation groups with respect to the issue.

MODULE WLD302: MAKING A DIFFERENCE TO WILDLIFE

Level: **Advanced**

Theme: **Social and Cultural Perspectives**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • examine ways in which individuals affect and are affected by wildlife.	*The student will:* •	20
• assess strategies used in managing wildlife spaces and species.	•	30
• demonstrate commitment to environmental stewardship through personal and shared actions.	•	50

MODULE WLD302: MAKING A DIFFERENCE TO WILDLIFE (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Our Relationship with Wildlife	*The student will:* • examine historical influences of wildlife on the development of cultures and societies; e.g.: – food, clothing and shelter – spiritual and aesthetic benefits – medicinal values – recreation and companionship • identify wildlife relationships expressed through art, literature, dance, music and drama • explain how social attitudes and values regarding wildlife have changed • examine positive and negative impacts of human populations on wildlife.
Management Strategies	• explain how decisions involving Canada's wildlife are a shared responsibility of government agencies and landowners, and are influenced by transboundary concerns • examine decision-making processes that affect wildlife and the environment; e.g.: – political – economic – social – scientific • describe two or more wildlife management strategies, and related trade-offs or compromises • compare the contributions of different stakeholder groups that conduct management activities; e.g.: – government and non-government organizations – business and industry – land owners – individual citizens • assess the impact of individual attitudes, actions and lifestyle on wildlife and its habitat; e.g.: – conservation ethic – consumer practices – recreational choices.

MODULE WLD302: MAKING A DIFFERENCE TO WILDLIFE (continued)

Concept	Specific Learner Expectations
Environmental Stewardship	*The student will:* • propose an individual action plan for managing wildlife that permits the achievement of social, cultural, economic and environmental goals; e.g.: – personal and shared actions – leadership roles • plan, conduct and assess a school-wide campaign to increase awareness of relationships between lifestyle, wildlife and the environment; e.g.: – establish goals – plan and conduct – assess results • debate an issue regarding the impact of lifestyle on wildlife; e.g.: – conduct research – develop a position – participate in debate • identify ways in which individuals can influence public decisions that affect wildlife and the environment; e.g.: – voting – lobbying – seeking office – supporting compatible interest groups.

MODULE WLD303: WILDLIFE RESEARCH

Level: **Advanced**

Theme: **Technology and Applications**

Prerequisite: **Wildlife Spaces and Species (WLD203)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • develop an understanding of the research process and its application to wildlife.	*The student will:* • identify major research components in an existing piece of research on a sample space or species.	40
• plan and conduct a research project on a wildlife space or species.	•	60

MODULE WLD303: WILDLIFE RESEARCH (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Research Process	*The student will:* • identify and describe major stages and steps in the research process; e.g.: – planning – information retrieval – information processing – information sharing – evaluation • explain applications of the research process in finding answers to questions about wildlife spaces or species • relate the research process to an existing piece of wildlife research.
Research Project	• identify a problem or question regarding a wildlife space or species; e.g.: – growth rate of a plant – bird preference to seed type – effect of light on plant growth – habitat preference of a mammal – overwintering of species – reproductive rate of composting worms • gather background information about the problem or question; e.g.: – library – computer – interview • propose a plan for conducting research related to the problem or question; e.g.: – experimental design – logistics – funding and partnerships • collect baseline and specific data using a variety of information gathering techniques; e.g.: – sampling and surveys – observation – measurement and estimation – experimentation • analyze and interpret data that is gathered, and formulate further questions

MODULE WLD303: WILDLIFE RESEARCH (continued)

Concept	Specific Learner Expectations
Research Project (continued)	*The student will:* • draw conclusions related to the problem or question; e.g.: – recommendations – management actions – further research • communicate the results of research through written reports and oral presentations.

MODULE WLD304: WILDLIFE MANAGEMENT I

Level: **Advanced**

Theme: **Management and Conservation**

Prerequisite: **Wildlife Research (WLD303)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • describe the functions of wildlife management.	*The student will:* •	20
• examine steps involved in developing a wildlife management plan.	• identify and describe major steps in an existing wildlife management plan.	40
• consider issues and problems impacting the management of wildlife spaces and species.	• analyze one or more wildlife issues: – state the problem – identify contributing factors and stakeholders – suggest a course of action – infer the consequences of actions taken.	40

MODULE WLD304: WILDLIFE MANAGEMENT I (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Functions of Wildlife Management	*The student will:* • describe wildlife management as a process to ensure long term viability of spaces, species and ecosystems • explain that wildlife management involves the preservation of endangered spaces and species, and conservation of all other spaces and species • analyze relationships between wildlife research and wildlife management.
The Management Process	• explain that wildlife management programs and policies are developed through political, social, economic and scientific processes • examine basic steps involved in developing a wildlife management plan; e.g.: – state goals and objectives – collect data and conduct research – gather government and non-government input – consider alternatives, consequences and potential conflicts – select a course of action – implement the action plan – monitor and evaluate outcomes – make recommendations and revisions
Issues in Wildlife Management	• examine a variety of issues and problems impacting the management of wildlife spaces and species; e.g.: – preservation versus conservation – problems with an "ecosystem management" approach – political boundaries and the species/people involved – legislation versus no legislation – public perception of wildlife management – the value of wildlife – environmental impact assessment plans and legislation • explain that the philosophies and objects of different wildlife management practices are sometimes incompatible with each other, and conflicts and trade-offs may occur.

MODULE WLD305: WILDLIFE MANAGEMENT II

Level: **Advanced**

Theme: **Management and Conservation**

Prerequisite: **Wildlife Management I (WLD304)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will:	*The student will:*	
• review basic wildlife management principles.	•	10
• develop a wildlife management plan.	•	90

MODULE WLD305: WILDLIFE MANAGEMENT II (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Basic Principles	*The student will:* • explain sustainable management within the context of wildlife spaces and species • explain how decisions involving wildlife in Canada are made by local, provincial and federal government agencies and private landowners • consider local opportunities for consultation and public involvement in wildlife management decisions.
Planning Process	• establish short- and long-term goals for the management of a wildlife space or species • examine scientific, economic and social factors that need to be addressed through the management plan • survey the views of different stakeholders and resolve conflicts that may arise; e.g.: – recreational – environmental – aboriginal – commercial • incorporate consultation with other resource users and public involvement into the planning process • identify alternative means of achieving the management goals, and select preferred alternatives • elaborate upon permits, licences or other legal agreements that may be required • develop a set of actions and present the management plan; e.g.: – a general description and background – long-term management objectives – short-term management objectives – proposed standards and guidelines – a schedule of short-term management activities • prepare a map to accompany and elaborate upon the management plan; e.g.: – boundaries – land cover and other resources in the area – physical features – history of past development – road access – proposed development activities • describe techniques for monitoring the management plan to ensure that goals are being achieved.

MODULE WLD306: ISSUES IN WILDLIFE II

Level: **Advanced**

Theme: **Management and Conservation**

Prerequisite: **Issues in Wildlife I (WLD206)**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards	Emphasis (%)
The student will: • acquire an understanding that current wildlife issues are complex and involve alternatives and consequences.	*The student will:* •	30
• consider how many problems, issues and trends involving wildlife in Canada are similar to those in other parts of the world.	•	30
• propose and participate in a possible course of action that fosters wildlife conservation and management.	•	40

MODULE WLD306: ISSUES IN WILDLIFE II (continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Issues Involve Alternatives	*The student will:* • outline historical trends in the recreational and/or commercial use of a wildlife space or species • describe ways in which stakeholder groups make use of the judicial, legislative and regulatory systems in working toward their objectives • analyze differing points of view regarding how, when and to what degree the space or species should be used • examine issues concerning the scientific, biological, aesthetic, economic and/or intrinsic value of the space or species.
Global Issues and Trends	• compare and contrast a Canadian issue involving wildlife with a similar issue in other parts of the world; e.g.: – habitat loss – distribution, diversity and abundance of species • consider global impacts of the recreational and/or commercial use of a wildlife space or species; e.g.: – social and cultural – economic – environmental • infer the long-range effects of acquiring, protecting, improving and restoring wildlife habitat in Canada and other parts of the world.
Personal and Shared Actions	• compare and contrast different philosophies, ethics and alternatives regarding how best to ensure its health and viability of a wildlife space or species • assess the goals and objectives of one or more wildlife conservation groups • debate a global issue regarding the consumptive and/or non-consumptive use of wildlife; e.g.: – conduct research – develop a position – participate in debate • develop consensus regarding a plan for the use of wildlife; e.g.: – conduct research – generate alternatives – agree to a workable solution • initiate responsible and ethical actions in relation to wildlife and the environment; e.g.: – personal actions – leadership roles.

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